



Ankit Panda

INDO-PACIFIC MISSILE ARSENALS

Avoiding Spirals and Mitigating Escalation Risks





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ENDOWMENT FOR
INTERNATIONAL PEACE

Ankit Panda

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Cover photo: U.S. Navy photo/Released

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ACKNOWLEDGMENTS

This report was made possible with generous funding from the Carnegie Corporation of New York, the John D. and Catherine T. MacArthur Foundation, the New-Land Foundation, the Skoll Foundation, and the Stanton Foundation. Megan DuBois, Natalie Montoya, Kylie Jones, Lisa Michelini, and Lydia Huang provided exceptional research assistance. The report benefited tremendously from Lindsay Maizland's excellent editing, Haley Clasen's proofreading, and Jocelyn Soly's eye for design and graphics. I am grateful for the many government officials and military officers in Australia, Japan, South Korea, Taiwan, and the United States who agreed to speak candidly in the course of my research. I would like to particularly thank George Perkovich, Toby Dalton, Vann Van Diepen, and Mark Fitzpatrick for their critiques of earlier drafts of this report. Finally, the ideas presented in the report also benefited from several insightful conversations with members of Carnegie's Nuclear Policy and Asia Programs. While this report would not have reached its final form without the contributions of the individuals named above, I am solely responsible for its contents.

ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
ATACMS	U.S. Army Tactical Missile System
AUKUS	trilateral defense-industrial partnership between Australia, the UK, and the United States
ASBM	anti-ship ballistic missile
A2/AD	anti-access/area denial
GDP	gross domestic product
GLCM	ground-launched cruise missile
HCOC	Hague Code of Conduct Against Ballistic Missile Proliferation
HIMARS	High-Mobility Artillery Rocket Systems
HGV	hypersonic glide vehicle
ICBM	intercontinental-range ballistic missile
INF TREATY	Intermediate-Range Nuclear Forces Treaty
JASSM	U.S. Joint Air-to-Surface Standoff Missile
JASSM(-ER)	U.S. Joint Air-to-Surface Standoff Missile Extended Range
KMPR	South Korea's Korea Massive Punishment and Retaliation
LDP	Japan's Liberal Democratic Party
LRASM	Long-Range Anti-Ship Missile

LRHW	U.S. Long-Range Hypersonic Weapon
MARV	maneuvering reentry vehicle
MBFR	Mutual and Balanced Force Reductions
MIRV	multiple independently targetable reentry vehicles
MTCR	Missile Technology Control Regime
NATO	North Atlantic Treaty Organization
NSM	Naval Strike Missile
PLA	China's People's Liberation Army
PLARF	China's PLA Rocket Force
PrSM	U.S. Precision Strike Missile
RV	reentry vehicle
SLBM	submarine-launched ballistic missile
SLV	space launch vehicle

CHAPTER 1

A NEW MISSILE AGE IN ASIA

The Indo-Pacific region is at the cusp of a new missile age, driven by perceptions of rising insecurity. Short- to intermediate-range surface-to-surface missile systems are quickly proliferating in the region.¹ While military planners and policymakers in the region may view these capabilities as essential to preserving peace and maintaining general deterrence, this proliferation could intensify already complex security dilemmas and heighten nuclear escalation risks in crises.

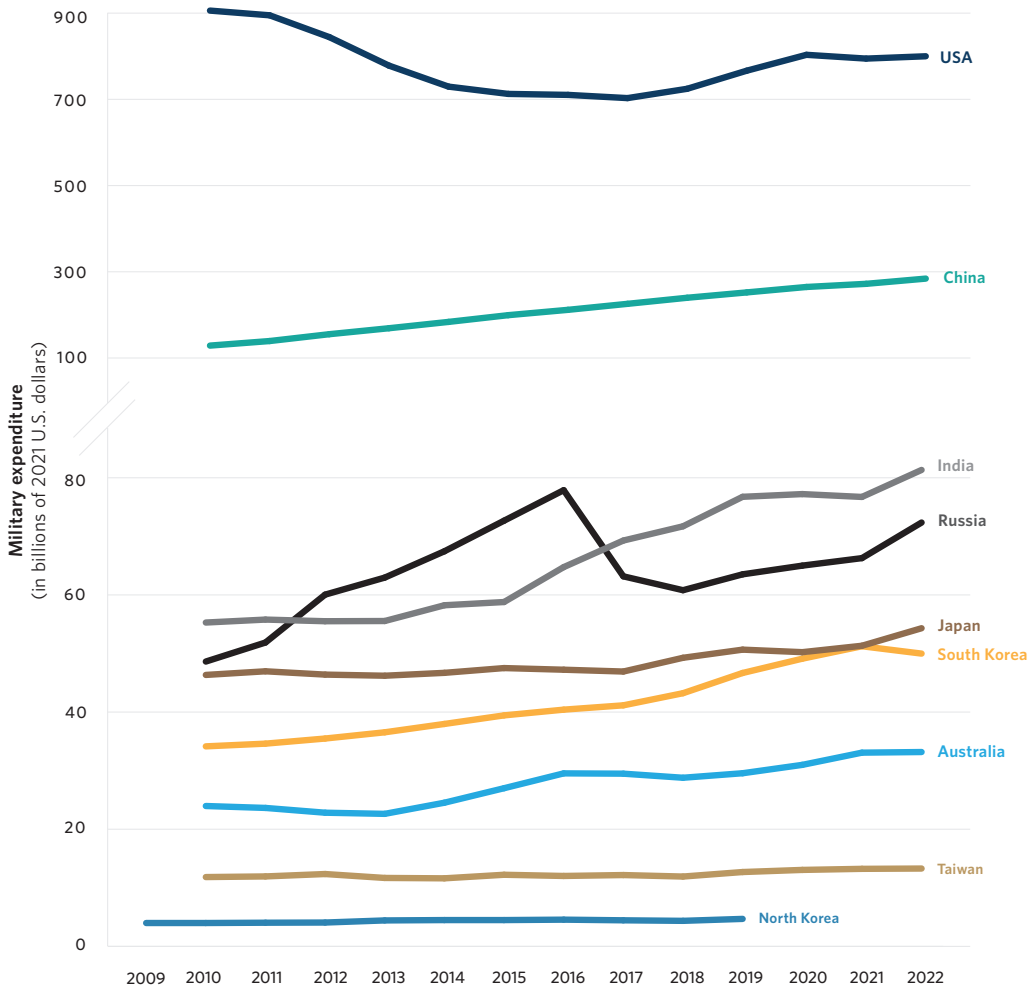
Contemporary geopolitical dynamics, including systemic competition between China and the United States, and worsening threat perceptions continue to drive substantial investments by regional states in a range of missile capabilities. Other structural shifts have influenced proliferation as well. Notably, after years of alleging Russian noncompliance, the United States left the 1987 Intermediate-Range Nuclear Forces (INF) Treaty in 2019. Washington is now pursuing new ground-launched missiles once again, with a focus on Asia. Action-reaction dynamics between North Korea and South Korea have further accelerated missile proliferation trends. These changes have received insufficient attention by regional policymakers as missile procurement plans have flourished in recent years. Moreover, though the majority of established and emerging missile capabilities in the region are conventional, the potential for these non-nuclear or, in some cases, dual-capable missile systems to intensify nuclear escalation risks has also gone underappreciated. Finally, the complete absence of any regional or subregional mechanisms of negotiated military restraint—never mind formal arms control arrangements—has allowed these trends to continue unabated. Together, these developments are detriments to strategic stability in Asia.

While systematic efforts to assess the risks stemming from missile proliferation in Asia remain limited, headlines from the region in recent years have underscored the drivers and consequences of proliferation. These include China's firing of ballistic missiles over Taiwan in August 2022, North Korea's unprecedentedly intense missile-launching campaigns in 2022 and 2023, South Korea's demonstrations of novel missile capabilities in 2021, Japan's debate in recent years over whether to procure missiles to hold at risk North Korean targets,² Australia's pursuit of long-range strike capabilities under the AUKUS arrangement, and Taiwan's passing in 2021 of a supplementary defense budget focused on indigenously developed surface-to-surface missile capabilities.³ The United States, too, has stood up several research and development programs for new ground-launched missile capabilities, unencumbered by the erstwhile limitations of the INF Treaty.⁴ Among these states, missiles are seen as essential for both deterrence and warfighting.

The proliferation of missile capabilities in Asia accompanies a broader surge in regional defense spending since the 2010s (see figures 1 and 2).⁵ The primary pursuers of significant new missile capabilities in East Asia—Australia, China, Japan, North Korea, South Korea, Taiwan, and the United States—all perceive acute security challenges and see value in long-range strike capabilities for deterrence and conventional warfighting alike. Four of these—Australia, Japan, South Korea, and Taiwan—are U.S. partners, and all but Taiwan are beneficiaries of treaty-codified collective defense arrangements.⁶ Along with the United States, these partners have particular concerns about China's regional ambitions and, with the exception of South Korea, are primarily pursuing missile capabilities to deter potential conventional military action against their interests by Beijing. South Korea, which has maintained a robust domestic missile development program since the second half of the Cold War, continues to primarily posture its forces to deter North Korean nuclear and conventional attacks, but over time it could take a more forward-leaning stance against China as well. A permeating, background concern for many of these allies continues to be long-term uncertainty about the reliability of the United States' extended deterrence commitments—a concern that grew salient in 2017–2021 when former U.S. president Donald Trump sometimes pursued an unorthodox approach to alliances. For these allies, the acquisition of new strike capabilities, while complementary to existing U.S. capabilities in an alliance context, also hedges against an uncertain future.

Amid these drivers, structural conditions in Asia today are not propitious for formal negotiated restraint, including risk reduction, confidence building, and arms control. Unlike the conventional arms buildup that took place in Europe during the Cold War and culminated in negotiated arms reduction processes, the multipolar nature of the contemporary pursuit of missile capabilities in Asia complicates the prospects for ambitious, formal risk reduction and arms control measures. Moreover, the presence of multiple nuclear-armed states with advanced missile capabilities—China, North Korea, the United States, and even India, Pakistan, and Russia—further adds complexity. Finally, unlike the Cold War, the states at the center of contemporary missile proliferation dynamics in Asia do not participate

Figure 1. Defense Spending of Select Indo-Pacific Countries, 2010–2022



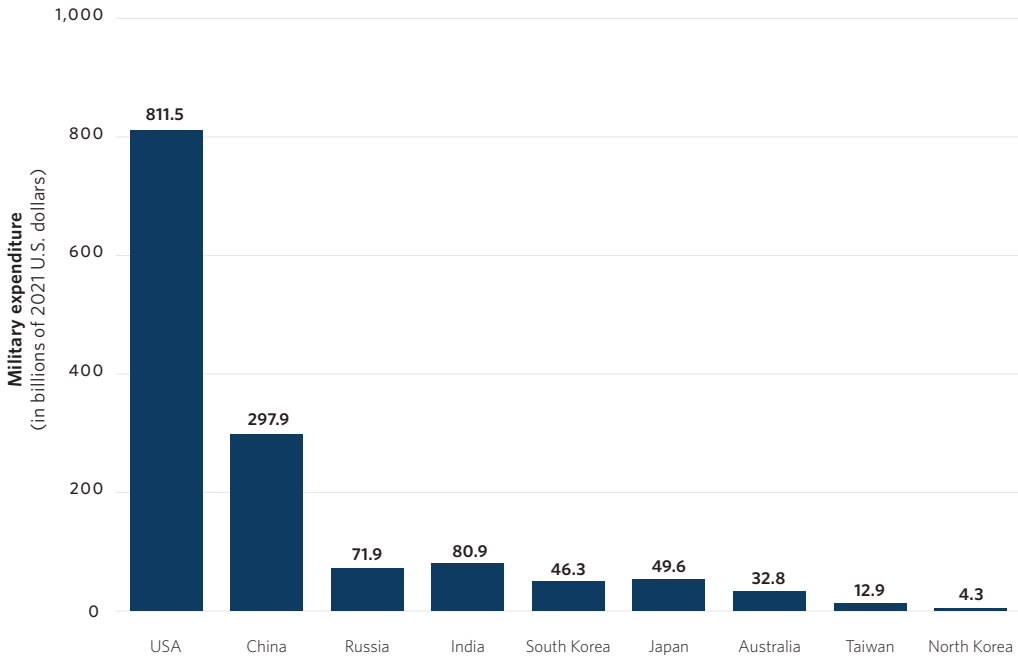
Source: SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>; and World Military Expenditures and Arms Transfers 2021, U.S. Department of State, December 30, 2021, <https://www.state.gov/world-military-expenditures-and-arms-transfers-2021-edition>.

Sources: SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>; and World Military Expenditures and Arms Transfers 2021, U.S. Department of State, December 30, 2021, <https://www.state.gov/world-military-expenditures-and-arms-transfers-2021-edition>.

Note: Data are in constant 2021 U.S. dollars, except for North Korea’s data, which are in constant 2019 U.S. dollars.

in regional collective defense arrangements like the North Atlantic Treaty Organization (NATO) and the erstwhile Warsaw Pact. While these types of arrangements are not essential to pursuing negotiated restraint, the Cold War condition of bipolarity limited the complexity of potential negotiations. Asia’s multipolar reality today complicates the task

Figure 2. Defense Spending of Select Indo-Pacific Countries, 2022



Sources: SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>; and World Military Expenditures and Arms Transfers 2021, U.S. Department of State, December 30, 2021, <https://www.state.gov/world-military-expenditures-and-arms-transfers-2021-edition>.

Note: Data are in constant 2021 U.S. dollars, except for North Korea's data, which are in constant 2019 U.S. dollars.

of achieving negotiated and verifiable restraint. The United States maintains its traditional hub-and-spoke alliance architecture in Asia through bilateral treaty arrangements with Australia, Japan, and South Korea and more diffuse commitments to Taiwan. While China and North Korea maintain a collective defense arrangement, which was first codified in 1961, their relationship is one of strained alignment⁷—especially as far as nuclear matters are concerned. Other states in the region pursue varied strategies of alignment, and many seek to preserve their strategic autonomy.

Given these complications, the tractability of missile-focused risk reduction efforts or arms control may appear questionable. While there are substantial obstacles to formalized arms control arrangements in the region, current trends if left unchecked are likely to significantly contribute to escalation risks, including nuclear escalation risks, through multiple

pathways. These pathways, discussed in greater detail in the following sections, include, inter alia, preemptive attack postures contributing to first-strike instability, national leadership targeting, and inadvertent escalation through misperceiving the intention behind missile strikes in times of war. Moreover, U.S. policymakers in particular must contend with a regional environment where treaty allies will be increasingly capable of delivering strategic effects on the battlefield with conventional missile capabilities, which could beget a nuclear response from China or North Korea under certain conditions.⁸ These dynamics demand sustained attention from U.S. and allied policymakers and military planners, who must explore and understand various escalation pathways and further coordinate their operational planning for various contingencies. Finally, the growing *variety* of missile capabilities could introduce technologically determined sources of escalation risk, including those pertaining to payload ambiguity,⁹ target ambiguity, and platform ambiguity. National defense establishments in the region have not sufficiently considered these risks as they have pursued missiles as an essential, cost-effective means of projecting power to various ends. To mitigate risks and avert spirals in future crises, policymakers and military planners must first recognize the array of risks and pathways to nuclear escalation that exist. Following this, defense policy processes and military plans can adapt to mitigate unnecessary escalation risks that may stem from existing postures, and regional diplomatic processes can explore negotiated restraint to the fullest extent possible. The trend toward missile proliferation in East Asia is unlikely to soon be reversed, but it is imperative that regional decisionmakers fully understand the scope of potential escalation risks and, out of an interest in averting nuclear war, work to limit these risks.

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CONCEPTUAL OVERVIEW OF MISSILES

Prior to exploring the drivers of vertical and horizontal proliferation in missile arsenals in the Indo-Pacific, it is essential to first taxonomize and define various surface-attack missile types to understand not only their putative advantages and drawbacks but also how they might contribute to escalation risks in times of crisis or conflict.¹⁰ Taxonomizing missiles is far from straightforward in the twenty-first century; traditional distinctions between ballistic missiles and cruise missiles, for instance, are insufficient in describing the contemporary missile landscape. Though technologies such as hypersonic glide vehicles and terminally maneuverable reentry vehicles are not conceptually novel, their proliferation both in Asia

and elsewhere means that laying out the distinctions between various missile types can be beneficial for understanding varied risks and their implications.¹¹

Despite the proliferation of complex missile types outside of research and development settings today, it is helpful to identify the fundamental concepts that unify *all* missile types. These characteristics can be understood as the sine qua non of missiles. At their core, all missile types make use of a chemical rocket booster for propulsion to both accelerate and elevate their payloads, which are weaponized in some form. This use of a weaponized payload, for instance, sets apart ballistic missiles from space launch vehicles (SLVs), which make use of rocket boosters and carry nonweaponized payloads, although large ballistic missiles could be used for space launch and SLVs could be used to carry weapons. Generally speaking (but not in all cases), the physical characteristics of the missile's booster, including its mass and fuel capacity, are strongly determinative of its range, which for rocket systems in particular varies with the mass of the payload. This payload-booster distinction explains why missiles are sometimes referred to as delivery systems; the object being delivered by the booster at range is the weaponized payload. The incorporation of some form of guidance system further distinguishes missiles from more rudimentary types of rocket-equipped munitions, such as unguided rocket artillery. There are various technologies used to improve guidance capabilities, ranging from the gyroscopic accelerometer systems used in the earliest missiles, like the German V2, to the considerably more advanced computationally assisted, multi-modal guidance systems on modern cruise missiles. Most of the contemporary complexity in describing missile types stems from the variety of possibilities concerning payload types. These possibilities are discussed in greater detail later.

Finally, while examining a given missile can spotlight its range and payload capabilities, all missiles in the real world are best understood as part of a broader *system*. This includes not only the missile itself but also its launcher as well as command-and-control systems, targeting subsystems, and, in the case of certain land-based missiles, fueling and reloading support vehicles.¹² Beyond the performance of the missile itself, other characteristics of a missile system can have substantial influence on its military effectiveness and desirability. Solid-propellant missiles, for instance, obviate the need for fueling support vehicles by virtue of having their propellant cast into their airframes during the manufacturing process. With some exceptions, liquid propellant missiles generally require fueling at some point prior to use, rendering them less responsive in a crisis in some cases and potentially more vulnerable to preemption given the more substantial signatures associated with any fueling activity in the field.¹³

THE BASICS OF MISSILE TYPES

Ballistic missiles with ballistic payloads. Ballistic missiles with ballistic payloads are the oldest type of continuously deployed land-attack missiles and among the most widely proliferated land-attack missiles in the world, including in East Asia. They are also the simplest to understand. Essentially, these missiles make use of rocket boosters to accelerate and elevate a payload on a particular azimuth—or direction—that then relies primarily on gravitational force to descend to a target. Apart from gravity, the sole other physical phenomenon influencing the behavior of a payload as it approaches its target after the booster burns out is atmospheric drag upon reentry. Most modern ballistic missiles feature separating reentry vehicles (RVs), which detach from one or more booster stages. (As the term “reentry” implies, the booster separates from the RV outside of the earth’s atmosphere.) These missiles rely on their guidance systems being cued prior to launch and thus are suited for use against known, stationary targets. When launched to long ranges, ballistic payloads reenter the earth’s atmosphere at high speeds. Regardless of the sophistication of their payload type, all missiles launched on a ballistic trajectory are prompt, with RVs arriving at their targets minutes after separation from their boosters. For much of the early missile age, the term “missile” was largely synonymous with “ballistic missile”; this has changed over time as cruise missiles and ballistic missiles using more advanced payloads with aerodynamic and impulsive maneuvering capabilities proliferated. Ballistic payload examples include the North Korean Hwasong-5/6, Russian R-17/Scud-B, and Chinese DF-11.

Ballistic missiles with aerodynamically maneuvering payloads. As mentioned earlier, gravity and atmospheric drag are the two salient physical phenomena that act on missile RVs, influencing their behavior. More advanced missiles often incorporate control surfaces and other physical features that can take advantage of aerodynamic drag to various ends. At the simplest end of the aerodynamically maneuvering payload spectrum are maneuvering reentry vehicles (MaRVs). These payloads use control surfaces to adjust the final trajectory of a separating RV after exoatmospheric ballistic flight to improve their accuracy against a fixed or mobile target and defeat terminal missile defense interceptors. Examples include the North Korean KN21, U.S. Pershing II, and Chinese DF-15.

A second type of aerodynamically maneuvering payload is the unitary aeroballistic (or “quasi-ballistic”) missile. These missiles do not feature separating booster stages—hence, they are “unitary,” combining booster and payload in a single object—and do not necessarily exit the earth’s atmosphere. Instead, the entirety of the missile’s body behaves as an aerodynamic object; after the missile’s booster burns out, the remainder of its flight features unpowered aerodynamic maneuvers. Aeroballistic missiles can behave similarly to MaRVs in their final moments of flight but otherwise glide at high speeds to their targets. Examples include the South Korean Hyunmoo-4, North Korean KN23, U.S. Army Tactical Missile System (ATACMS), and Russian Iskander-M.

A final type of aerodynamically maneuvering payload is the hypersonic glide vehicle (HGV). HGVs are often regarded as a distinct type of hypersonic missile, but they behave according to the same physical principles as other payloads in this category and can be thought of as lying at the far end of a spectrum from MaRVs, which only maneuver in their terminal phase. Like MaRVs, HGV payloads incorporate physical design features to take advantage of aerodynamic lift and drag forces. Also like MaRVs, HGVs separate from booster stages. Unlike MaRVs, however, they reenter the earth's atmosphere much sooner in their flight trajectories and spend the majority of their total flight time gliding at hypersonic speeds (defined as greater than five times the local speed of sound in a given medium¹⁴); in this way, they are also similar to aeroballistic missiles. These shared attributes explain why these three payload types are best understood as part of the same overall capability spectrum. Compared to purely ballistic missiles, however, HGVs can exhibit a longer time-to-target. While HGVs are capable of maneuvering throughout their flight, substantial maneuvers early in an HGV's flight trajectory will come at the cost of speed and range.¹⁵ While the physical principles behind HGVs have been understood for decades,¹⁶ advances in materials science and guidance have allowed these systems to become practically deployable weapon systems. HGV payloads endure tremendous thermal and aerodynamic stresses in flight. Beyond this, growing concerns about area and point missile defenses have prompted interest in these capabilities within various military establishments around the world, including in Asia. Examples of HGVs include the Chinese DF-17, U.S. Dark Eagle, and North Korean Hwasong-8.

Ballistic missiles with powered maneuvering payloads. A third distinct category of ballistic payload features active propulsion, either on the RV itself or on a post-boost vehicle. The latter is most commonly associated with multiple independently targetable reentry vehicles (MIRVs) but can also be used to improve the accuracy of a single-RV payload. In the case of MIRVs, the powered “bus” payload carrying the RVs, once separated from its rocket booster stages outside the earth's atmosphere, maneuvers to orient each warhead toward a distinct target and releases each warhead along its own ballistic trajectory to descend to its target relying primarily on gravitational force. The individual RVs may themselves exhibit other payload characteristics described above (such as terminal maneuvers). MIRVs are not a prominent feature of this report given their primary application in strategic intercontinental missile systems, but shorter-range MIRV capabilities are under development in South Asia by India and Pakistan and were deployed in Europe during the Cold War.

The second form of powered maneuvering payload—and the one more relevant to this report—comprises ballistic missiles designed to strike certain mobile targets, most prominently ships. This new type of missile is less understood in open sources, though it is often covered in news media given its novelty and potential to disrupt the prominence of sea power in the Indo-Pacific. Anti-ship ballistic missiles (ASBMs) likely require both exceptionally advanced RVs that incorporate features consistent with MaRVs and powerful kick motors to allow for rapid error-correction prior to and after reentry to strike mobile targets whose

positions may change by hundreds of meters during the missile's overall flight.¹⁷ ASBMs remain a niche capability, and their real-world performance remains uncertain. Examples include the Chinese DF-21D, Chinese DF-26 anti-ship variant, and Iranian Fattah missile.

Land-attack cruise missiles. Land-attack cruise missiles share little in common with the previously described missile and payload types. These missiles fly entirely within the earth's atmosphere, exhibit powered flight with the use of sustainer propulsion throughout their whole trajectory, and are highly maneuverable. Contemporary long-range cruise missiles are "air-breathing," meaning that they use the surrounding atmosphere as their oxidizer, increasing fuel efficiency. In many cases, cruise missiles will use a small chemical rocket booster to initiate their air-breathing sustainer engines.¹⁸ Their low-altitude flight, high maneuverability, and small size can in combination offer substantial advantages in stressing missile warning systems and defenses, which often detect cruise missiles only as they approach their targets. (Exoatmospheric ballistic missile payloads, by contrast, can be detected by surface radars at longer ranges due to their high altitudes.) While advanced cruise missiles, such as the U.S. Joint Air-to-Surface Standoff Missile (JASSM) and its variants, are considered low-observable munitions, even-more-rudimentary cruise missiles are challenging to track for most states. Traditionally, cruise missiles have been juxtaposed against ballistic missiles as the second major missile type, but the proliferation of nonballistic payloads described above suggests that this dichotomy is no longer appropriate. Most deployed cruise missiles feature turbofan or turbojet engines and fly at subsonic speeds; compared to the time-to-target of ballistic payloads, which are measured in minutes, cruise missiles are generally substantially slower. Advances in sustainer engines have allowed for some states to develop supersonic cruise missiles that incorporate ramjet and/or rocket engines. More advanced cruise missiles in development aspire to hypersonic speeds with the use of supersonic combustion ramjet, or scramjet, engines. These missiles still reach speeds in the relatively low end of hypersonic flight at Mach 5–8. Examples of subsonic cruise missiles include the U.S. Tomahawk, Chinese DF-100, South Korean Hyunmoo-3, and Taiwanese Hsiung Feng IIE; examples of supersonic cruise missiles include the Russian-Indian BrahMos and Chinese YJ-12; an example of a hypersonic cruise missile is the Russian Tsirkon.

MISSILES IN MODERN WARFARE

As explained earlier, missiles are, in essence, delivery systems for weaponized payloads at range. For this reason—and with the exception of strategic nuclear missiles designed to range across continents—theater-range missiles of all types are understood to have tactical and strategic effects comparable to those of traditional airpower, albeit with many qualitative advantages over crewed and uncrewed aircraft. Early theoretical examinations of the influence of missiles on modern war—especially in the nuclear age—took airpower theory as their starting point.¹⁹ The drivers of missile procurement and proliferation around the world today largely hew to these same principles. Missiles, like airpower and artillery,

may not win wars on their own, but they are seen by military establishments and defense policymakers as critical enablers of victory. The difficulty of comprehensive missile defense or defeat—both as a practical matter and in terms of costs—also enhances the perceived deterrence potential of substantial missile arsenals. Deterrence-by-punishment strategies that rely on convincing an adversary of an assured ability to inflict damage are well served by large missile arsenals that cannot be easily or cost-effectively defended against, raising the perceived costs of aggression by an adversary. Many of these same characteristics render missiles the ideal delivery system for nuclear weapons; every nuclear-armed state today relies on missiles as its delivery system of choice, supplemented in some cases by other means of delivery.

The most important qualitative improvement over the course of the missile age has been in precision guidance capabilities. Early missiles, lacking precision, were largely only seen as useful either for the delivery of massively damaging payloads, which could cause damage to their intended targets even if they strayed far off their notional aimpoints, or as weapons of

terror against nonmilitary targets, such as cities. Lacking precision, a single missile or a small number of missiles could not be effectively used to achieve tactical effects on the battlefield, especially with conventional warheads. The advent of more precise missiles has significantly improved the value of missiles to modern militaries seeking to achieve tactical and strategic effects at long ranges and with conventional warheads. As this report demonstrates,

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states with significant conventional missile arsenals—or plans for them—in the Indo-Pacific aspire to use these capabilities to hold at risk a range of military targets to augment strategies of deterrence by denial and deterrence by punishment. Even missile pursuers that largely lacked precise missiles a little more than a decade ago, such as North Korea, have made substantial advances in precision guidance technologies.

The advent and proliferation of precision guidance have made missiles an attractive conventional military capability for many states, but even the most precise missiles depend on substantial enabling factors to prove effective in times of conflict. Robust intelligence, surveillance, and reconnaissance—both in peacetime and in times of conflict—is critical to assessing the location of mobile and fixed targets. Missiles themselves are the final link in the long-range strike kill chain, which depends, as it has for decades, on the ability to find, fix, and finish targets. As missiles proliferate for offensive use, defenders adapt. China and North Korea, for instance, have for many years feared U.S. long-range precision strike capabilities and thus exhibit a strong preference for road-mobile theater-range missile systems, hoping to complicate as much of the kill chain as possible and improve

survivability. However, fixed targets, such as known command-and-control nodes and support facilities, remain especially vulnerable and are thus attractive targets for long-range strikes. Defenders, as a result, look to active and passive defenses. (Active defenses comprise missile defense technologies, while passive defenses encompass camouflage, concealment, deception, mobility, and hardening, inter alia.) These measure-countermeasure dynamics are currently at play in the Indo-Pacific and will remain so as missile capabilities continue to proliferate.

In Asia, amid rising geopolitical tensions and a growing assessment by several states that the risk of interstate war is growing, defense budgets have surged, and long-range strike capabilities are almost universally valued. While military planners and policymakers are drawn to missiles due to their many desirable characteristics in augmenting conventional deterrence, they must better understand the risks that accompany rapidly proliferating missile arsenals. Furthermore, regional states are drawn to long-range strike capabilities for differing reasons.

Map 1. General Overview of the Indo-Pacific



CHAPTER 2

REGIONAL MISSILE ARSENALS: STRATEGIES AND DRIVERS

General insecurity in the Indo-Pacific has risen in recent years, but the two most likely flash points that could result in a major conflict are the Taiwan Strait and the Korean Peninsula (see map 1). As a result, this report focuses largely on the primary powers implicated in these potential flash points, including China, North Korea, and the United States. Australia, Japan, and South Korea, the preeminent regional U.S. allies, are also significant players. While South Korea has developed a robust arsenal of missiles over decades, both Australia and Japan are quickly adapting to what each perceives as a less secure region.

The regional missile arsenals of other relevant states that could bear on potential crises in the Indo-Pacific—most notably, India and Russia—are not discussed in this chapter due to their limited direct

bearing on potential conflicts in the Taiwan Strait or the Korean Peninsula. Both states are discussed in greater detail further in the report; Russia's role in the lead-up to the collapse of the INF Treaty, in particular, is discussed at length in chapter 3, which focuses more broadly on the United States' conventional missile development plans for the Indo-Pacific.

General insecurity in the Indo-Pacific has risen in recent years, but the two most likely flash points that could result in a major conflict are the Taiwan Strait and the Korean Peninsula.

CHINA

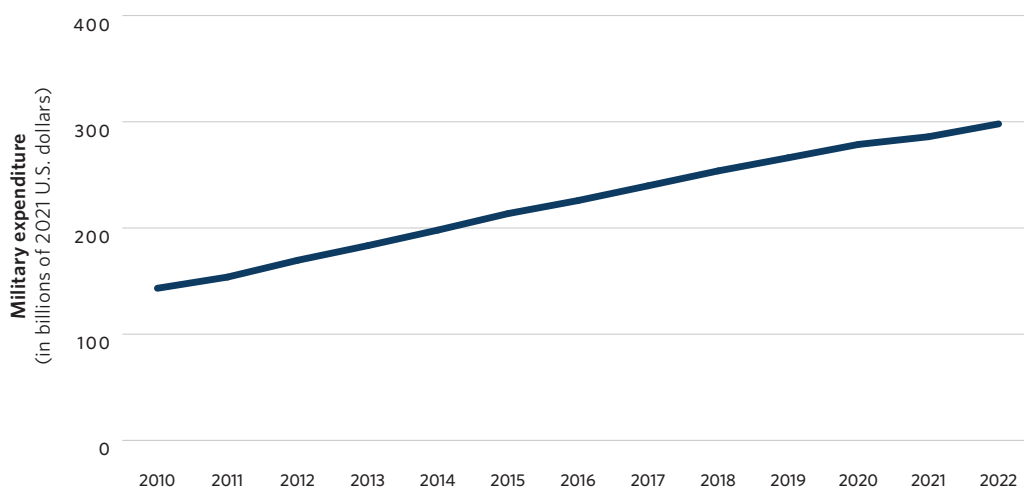
China possesses a large, diverse, and growing arsenal of nuclear and non-nuclear missiles across all range classes and types. While Chinese missile forces do not outsize those of the United States in all categories, Beijing notably possesses a much larger arsenal of ground-based short-, medium-, and intermediate-range ballistic and cruise missiles than does the United States, which had forgone missiles with a range of 500–5,500 kilometers due to the 1987 INF Treaty. China's efforts at developing a capable missile force trace their origins to the early Cold War, with the primary motivator initially being the search for a reliable means of long-range nuclear weapons delivery. The Second Artillery Corps of the People's Liberation Army (PLA), the antecedent organization to today's PLA Rocket Force (PLARF), was stood up in 1966, two years after China's first nuclear test. By the 1980s and 1990s, after China had developed and deployed a limited number of large, liquid-propellant strategic missiles capable of ranging the contiguous United States, Beijing embarked on a broader missile modernization effort. Bureaucratic and industrial drivers during that time, rather than a specific, top-down strategic directive, led to rapid growth in China's missile capabilities—particularly regional missiles.²⁰

The growth of China's missile forces in the post-Cold War era has further coincided with Beijing's broader economic growth and concomitant increases in military spending. Moreover, while China's longer-range missiles during the Cold War were exclusively nuclear, over the last three decades, Beijing has built up a potent force of conventional and dual-capable missiles up through intermediate ranges.²¹ During the early 1990s, China began to introduce new, short-range missiles, such as the conventional, single-stage, solid-propellant DF-15, to bases in range of Taiwan. An acceleration in the growth of certain classes of Chinese missiles in the late 2010s and early 2020s, such as hypersonic missiles and intermediate-range missiles, has coincided with growing threat perceptions vis-à-vis the United States. While China's surface-attack missile forces are composed primarily of ballistic missiles, including ballistic missiles with MaRVs, Beijing has also pursued and deployed cruise missiles in land-attack roles.²² Finally, China is the first country to have deployed an operational hypersonic boost-glide vehicle-equipped missile, the DF-17, for a theater mission.²³ The contours of Chinese missile forces continue to shift amid a broader military modernization effort to realize, by the centennial of the People's Republic's founding in 2049, what Chinese President Xi Jinping has called a “world-class military” (see figure 3).²⁴

Contours of China's Regional Missile Forces

The majority of Chinese regional missiles are ground launched and operated by the PLARF. Pursuant to military reforms in late 2015, the PLARF was established as a successor to the Second Artillery Corps, the original military organization that was charged with the operation of Chinese missile forces upon its creation in 1966. The PLARF, alongside the PLA Ground Force, PLA Navy, PLA Air Force, and PLA Strategic Support Force, is an inde-

Figure 3. Chinese Defense Spending, 2010–2022



Source: SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>.

Note: Data are in constant 2021 U.S. dollars.

pendent branch of the Chinese military and reports to the Central Military Commission of the Chinese Communist Party.²⁵ Importantly, the PLARF oversees the totality of China’s ground-based missile forces, including all nuclear-capable missiles up to intercontinental-range ballistic missiles (ICBMs). Of the PLARF’s nine primary organizational subdivisions, known as bases,²⁶ six (Bases 61 through 66) are operational missile units.²⁷ These units vary in their composition: some are composed nearly exclusively of ICBMs (such as Base 66), and others contain a mix of conventional, dual-capable, and theater-range nuclear systems (such as Base 61).²⁸ Each PLARF base is further subdivided into missile brigades.

Two Chinese theater-range, ground-launched missile systems—and a possible third—are dual-capable. One of these—the medium-range family of ballistic missiles known as the DF-21/CH-SS-5—features two exclusively nuclear-armed variants: the DF-21A and another with an unknown Chinese designation (occasionally reported as the DF-21E). Two other variants of the DF-21, including the DF-21C and DF-21D, are conventional. The DF-21A features externally observable differences that distinguish it from the land-attack variant DF-21C and the anti-ship variant DF-21D (discussed in greater detail later). The DF-26 is the second Chinese dual-capable regional system. It is a road-mobile, intermediate-range ballistic missile that can range to the U.S. territory of Guam from most easterly launch points in mainland China. Since it was first deployed in 2016, the overall inventory of available DF-26 launchers has rapidly grown in China. According to the U.S.

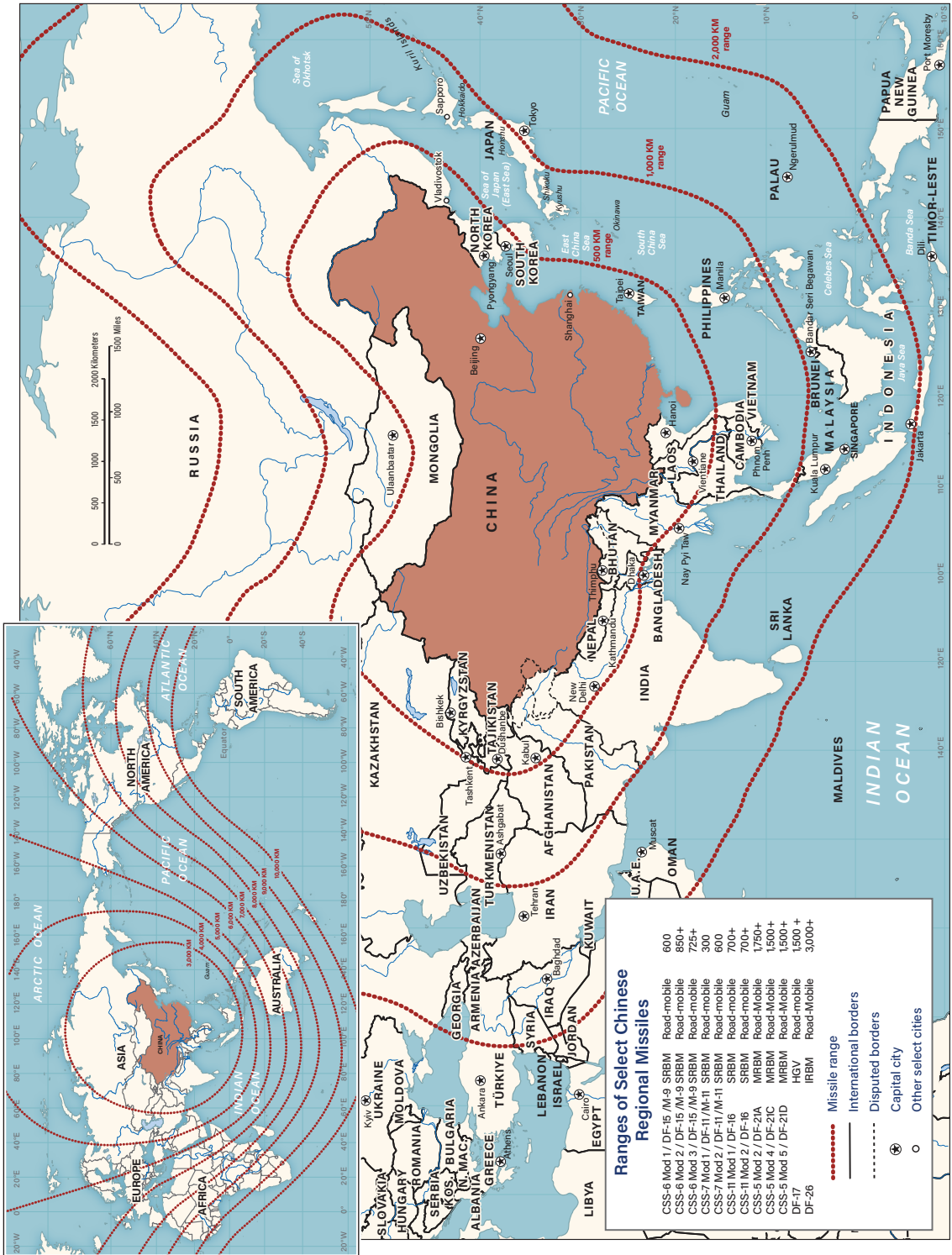
Department of Defense's annual estimates, the PLARF operated between sixteen and thirty DF-26 launchers in 2018, eighty in 2019, and two hundred by 2020.²⁹ In 2022, the United States assessed that China possessed approximately 250 DF-26 launchers.³⁰ The DF-26 is unique among all Chinese ground-launched missiles in that its payload is quickly field swappable, allowing for operational units to relatively rapidly switch between conventional and nuclear warheads. This feature has raised particular concerns about prelaunch warhead ambiguity concerning this system.³¹ Like the DF-21, the DF-26 also has an anti-ship variant. U.S. intelligence leaked in 2023 identified a new missile, designated the DF-27, which is reported to be an HGV-equipped system exhibiting a slightly greater range than the DF-26.³² The third Chinese ground-launched, dual-capable system is the DF-17, the first operationally deployed medium-range HGV-equipped missile system. The DF-17 was revealed at a military parade in 2019, where state media described the system as conventional. Parts of the U.S. intelligence community, however, appear to assess that the DF-17 is dual capable.³³

Beyond these dual-capable systems, China possesses a diverse array of short- and medium-range conventional ballistic and cruise missiles that nonetheless could be retrofitted to carry nuclear payloads. These include the short-range DF-15 and DF-16, each of which features multiple variants. Brigades operating both missiles are deployed within range of Taiwan and Japan's southern Ryukyu Islands (including Okinawa). Notable cruise missile capabilities include two ground-launched cruise missiles (GLCMs): the 1,500-kilometer-range CJ-10/DH-10 and the 2,000-kilometer-range CJ-100/DF-100. China has an active research and development program for hypersonic cruise missiles,³⁴ but no such missiles are known to be deployed. China also operates a variety of ground-launched coastal defense cruise missiles, including the 400-kilometer-range supersonic YJ-12.³⁵

Anti-ship Ballistic Missiles

China has sought to develop ASBMs for more than a decade, with mixed results.³⁶ These capabilities have received disproportionate attention in the United States due to their role in underpinning an anti-access strategy for China that seeks to hold at risk U.S. warships within the first and second island chains (see map 2). To date, it remains uncertain the extent to which China's ASBM capabilities offer a militarily significant and proven capability. Colloquially dubbed "carrier-killer" missiles, China's two ASBMs—the DF-21D and a DF-26 variant—were both flight tested against a moving live ship target in the South China Sea for the first time in 2020. Senior U.S. officials confirmed that such a test had taken place, but they did not confirm whether the test successfully demonstrated an ability for the ASBM's RV to strike the target.³⁷ Since these tests were carried out, further land-based testing of the missiles appeared to be underway, suggesting that the 2020 tests may not have been entirely assessed as successes. For instance, a facility first built in 2019 in the Chinese desert incorporating a mobile target that roughly resembles the dimensions of a

Map 2. Range of Select Chinese Regional Missiles



U.S. Ford-class aircraft carrier saw renewed activity after the 2020 tests.³⁸ ASBMs represent a formidable technical challenge due to the extremely high levels of precision required to strike a mobile target at sea and the consequent need to quickly update the missile with near-real-time positional data. Given the sustained concern expressed by U.S. analysts and officials about China's ASBM capabilities, it would appear that these capabilities may have a deterrent effect on the United States in a conflict, even if technical shortcomings may limit performance.

Missiles in Chinese Strategy

Authoritative Chinese texts on military operations, including the 2020 edition of *Science of Military Strategy*, make multiple references to the roles of missiles in warfare. These include everything from “warning military strikes” with “relatively isolated” effects to large-scale “missile fire assaults” on targets including “reconnaissance and early warning capabilities and command and control capabilities.”³⁹ With regard to long-range conventional missiles, *Science of Military Strategy* (2020) further underscores their role in carrying out “a certain scale of conventional precision strikes against the enemy’s deep and important strategic targets.”⁴⁰ The effectiveness of this approach depends on quantitative and qualitative factors, the text notes, including “the number, range, and accuracy of the missiles.”⁴¹ The text further underscores that the sufficiency of China’s conventional missile forces depends on quantitative factors more than qualitative ones due to the large number of “strategic and operational” military targets that would need to be held at risk in a local war.⁴² Overall, missiles are seen as an essential component of pursuing “active defense,” the central strategic guideline of China’s broader defense strategy.⁴³

The primary conflict scenario informing these assessments concerns what Chinese texts refer to as “information-based local war” (or “informatized wars”).⁴⁴ China’s missile forces are not defined as the primary enabler of victory in such wars but instead are a source of “important support for winning” them.⁴⁵ This conflict scenario took on prominence in the 2014 strategic guidelines for the PLA, which also emphasized joint operations. China’s 2015 *Military Strategy*, a defense white paper released by the State Council Information Office, emphasizes the growing role of “long-range precision strikes” for the then PLA Second Artillery Corps.⁴⁶ Missiles, however, are treated as one among many components of national military power; the 2015 military strategy also emphasizes the role of “maritime military struggle” and the need for China to develop robust naval power.⁴⁷ Finally, given the Second Artillery Corps’ and the PLARF’s stewardship of China’s land-based strategic nuclear forces, dual-capable medium- and intermediate-range missiles, and conventional missiles, delineations between “theater” and “strategic” strikes are often blurred.

More specialized texts, such as *The Science of Second Artillery Campaigns* (2004),⁴⁸ discuss missile operations, strategy, and deterrence in substantially greater detail—particularly as missiles relate to joint military operations. *The Science of Second Artillery Campaigns* de-

scribes long-range precision strike weapons as “an important means and an indispensable operational force in our military’s joint operations for penetrating the enemy’s air defense system, striking the enemy’s in-depth targets, and seizing air and naval dominance in future local wars.”⁴⁹ It further emphasizes the importance of both qualitative and quantitative factors in achieving strategically significant effects with missiles, underscoring the need to penetrate air and missile defense systems while ensuring sufficiently high levels of precision to achieve “clear strike effects” against a range of military targets.⁵⁰ PLA analysis of U.S. battlefield successes in the first Gulf War, during which precision-guided munitions featured prominently, prompted greater interest in the enabling role of robust intelligence, surveillance, and reconnaissance capabilities for targeting and damage assessment.⁵¹ As Chinese analysts have observed Russia’s large-scale use of nominally precise missiles against Ukrainian targets to relatively limited strategic effect in the Russia-Ukraine War, the importance of robust targeting and enabling technologies has likely been reinforced.

Beyond conventional capabilities, Chinese strategists see nuclear-armed missiles as contributing to general deterrence of conventional war escalation and adversary nuclear coercion, in line with long-standing Chinese concerns about possible nuclear coercion in limited crises, primarily by the United States.⁵² China continues to adhere to a no-first-use nuclear declaratory policy, first articulated after its initial nuclear test in 1964.⁵³ U.S. analysts and officials routinely express doubt that China would adhere by its declared, no-first-use stance in a crisis, however. U.S. analysts have drawn attention to the possibility of large-scale pre-emptive strikes early in a regional conflict by Chinese conventional missiles, aiming primarily at bases and other critical logistics nodes of a broader U.S. war effort.⁵⁴ Because of persistent doubts in the United States around China’s no-first-use pledge and its introduction of theater-range, dual-capable missiles, U.S. planners are concerned about the prospect of limited nuclear first use by China.⁵⁵ The substantial quantitative and qualitative increases in China’s missile arsenal between the mid-1990s and the late 2010s have underpinned these concerns, which remain pervasive and are partly driving ongoing U.S. investments in regional strike capabilities.

China’s missile capabilities, however, are not solely directed toward U.S. capabilities and assets in the region. Beijing’s vast missile arsenal can project military power all along its periphery, including into disputed waters and islands in the East and South China Seas and, most importantly, into Taiwan. The central mission for the PLA remains the defense of China’s core interests, which include territorial integrity and sovereignty. As Beijing’s recent defense white papers note, the preeminent warfighting scenario for the PLA remains a conflict over Taiwan. Missiles have featured prominently in Chinese signaling over Taiwan. During the Third

Beijing's vast missile arsenal can project military power all along its periphery, including into disputed waters and islands in the East and South China Seas and, most importantly, into Taiwan.

Taiwan Strait Crisis in 1995–1996, the Second Artillery Corps carried out two “large-scale conventional deterrence firing exercises,”⁵⁶ designed to signal Beijing’s ability to inflict damage against Taiwan-based targets. In August 2022, following a visit to the island by then U.S. speaker of the House of Representatives, Nancy Pelosi, the PLARF launched multiple DF-15 missiles around Taiwan, overflying Taipei in the process.⁵⁷ In April 2023, the PLA claimed that it had simulated strikes on “key targets” in Taiwan; an animation released by official Chinese state media and attributed to the PLA’s Eastern Theater Command showed strikes from mainland-based ballistic and cruise missile units on Taiwanese cities.⁵⁸ Such strikes would likely be an important enabling component of a broader amphibious invasion campaign.

SOUTH KOREA

South Korea possesses an advanced conventional missile force that is rapidly evolving. The origins of the country's indigenous missile development efforts can be traced back to the early 1970s. These initial efforts coincided with the country's clandestine efforts to pursue nuclear weapons under president Park Chung-hee (1962–1979).⁵⁹ In the post-Cold War era, South Korea's Agency for Defense Development has overseen a wide-ranging set of missile development projects. Land-attack missiles have been a prominent focus of these efforts. Beginning with the Lee Myung-bak administration (2008–2013), South Korea's independent missile capabilities assumed particular prominence in the country's broader military planning efforts to counter the growing threat from North Korea, the country's primary, nuclear-armed adversary.⁶⁰ Under the conservative Park Geun-hye administration (2013–2017), South Korea broadly adapted its pursuit of missile capabilities to a new strategic approach built around three concepts: the Kill Chain, Korea Air and Missile Defense, and Korea Massive Punishment and Retaliation (KMPR). This K3 suite of capabilities has been sustained since, including under the progressive Moon Jae-in administration (2017–2022), which temporarily rebranded each capability.⁶¹ The conservative Yoon Suk-yeol administration, which took office in 2022, seeks to establish a new strategic command (K-STRATCOM) by 2024 that will oversee these capabilities.⁶² The drivers of South Korea's missile development efforts include deterrence of North Korea, hedging against future uncertainty, and, to a lesser extent for now, interest in buttressing its domestic defense industrial base, overall military power, and regional influence. Some analysts have described Seoul's broader missile strategy as one of conventional counterforce and damage limitation against North Korea.⁶³

Dwindling Restraint: The U.S.-South Korea Missile Guidelines

An important constraint on South Korea's indigenous missile capabilities was put in place at the end of the 1970s, amid broader U.S. efforts to ensure that its ally did not develop nuclear weapons after Seoul's clandestine nuclear program was discovered and terminated. Originally articulated in a classified bilateral understanding between Washington and Seoul in 1979, South Korea agreed not to develop missiles capable of delivering payloads heavier than 500 kilograms to ranges in excess of 180 kilometers in exchange for technical assistance on missile technologies from the United States.⁶⁴ Over time, these guidelines were repeatedly updated and revised—sometimes in response to advances by North Korea. In 2001, the guidelines were first updated to increase the allowable level of missile development from the original 180 kilometers/500 kilograms to 300 kilometers/500 kilograms, thereby bringing both range and payload limits in line with Missile Technology Control Regime (MTCR) Category I definitions. In 2012, the Lee administration lobbied the administration of U.S. president Barack Obama for further changes to the guidelines following prominent inter-Korean clashes in 2009 and 2010. The 2012 revision, like its 2001 predecessor, further

increased the limitation to 800 kilometers/500 kilograms, thereby granting Seoul the ability to, for the first time, pursue missile systems capable of striking any target in North Korean territory from all conceivable launch points in South Korea. In 2017, the quickly advancing North Korean missile threat partially prompted further revisions to these guidelines, with the administration of U.S. president Donald Trump scrapping the payload limitations on South Korean missile development entirely while leaving the range limit of 800 kilometers intact. This was notionally a result of South Korean interest in developing heavy conventional payload missiles that could hold at risk certain deeply buried North Korean targets. Finally, in May 2021, during the first U.S.–South Korea summit meeting after the inauguration of President Joe Biden, the two sides announced that the missile guidelines had been totally scrapped, leaving South Korean missile development efforts fully unconstrained by externally agreed measures of restraint for the first time since 1979.

While range and payload constraints for ballistic missiles had been the primary features of the U.S.–South Korea bilateral missile guidelines, a secondary set of proscriptions limited Seoul’s use of solid propellants for SLVs. A July 2020 modification to the U.S.–South Korea missile guidelines removed these limits entirely, allowing Seoul for the first time to be capable of “developing, producing, and possessing” solid-propellant SLVs.⁶⁵ Because of common technologies involved in SLVs and long-range missiles, this modification to the guidelines might have generated concerns about a long-range South Korean missile program. But prior changes to the guidelines, including the payload limit removal in 2017, were more consequential to this end and manifested in new South Korean missile capabilities. Instead, Seoul’s interest in solid-fuel SLVs was motivated by the pursuit of more economic launchers for certain types of military reconnaissance satellites destined for low earth orbit. These satellites will have an important role in enabling South Korean military operations against North Korea by improving aggregate intelligence, surveillance, and reconnaissance capabilities available to Seoul. South Korea’s first successful test launch of a solid-fuel SLV took place in March 2022, the same month North Korea carried out its first full-range successful ICBM test on a lofted trajectory since 2017.⁶⁶ An official South Korean statement underscoring the significance of the SLV test noted that it was a “key milestone” in Seoul’s ongoing efforts to set up a “unilateral space-based surveillance system and bolster defense capability.”⁶⁷

Drivers of South Korean Missile Development

In the twenty-first century, South Korea’s domestic ground-based missile program has largely focused on the development of precise, conventionally armed, short-range ballistic missiles and a medium-range cruise missile, the Hyunmoo-3. Along with investments in improved intelligence, surveillance, and reconnaissance capabilities, these missile capabilities are primarily envisaged as contributing to the deterrence of North Korean attacks and, should deterrence fail, a range of warfighting objectives. These objectives include, first, lim-

iting damage from North Korean nuclear and conventional missiles and artillery through preemptive and counterbattery strikes and, second, retaliating against the North Korean leadership (including North Korean leader Kim Jong Un) if Pyongyang employs nuclear weapons. These final two objectives were crystallized under the Park Geun-hye administration as the Kill Chain (preemption) and KMPR (decapitation), respectively. These strategies continue to drive South Korea's investments in missile capabilities and have been sustained by successive governments since.

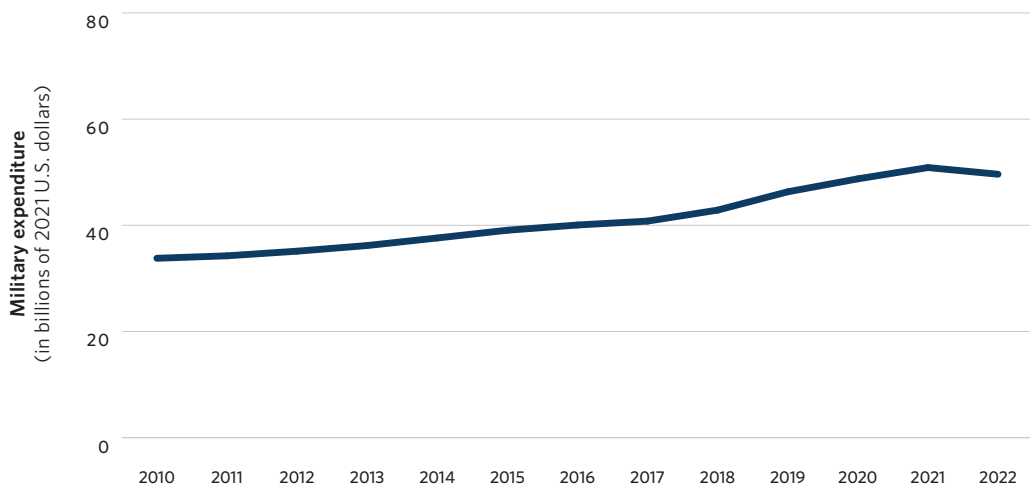
South Korea's missile capabilities have qualitatively improved alongside North Korea's pursuit of ever-more-advanced nuclear and missile capabilities throughout the 2010s. By the end of the 2010s, Seoul's missile capabilities had come to underpin what two scholars termed a "conventional counterforce" strategy, whereby South Korea was explicitly signaling its intention to destroy its nuclear-armed neighbor's ability to employ and release nuclear weapons with non-nuclear weapons.⁶⁸ North Korea, too, has emphasized preemption in its own declaratory doctrine, raising crisis stability concerns on the Korean Peninsula; both countries have strong incentives to shoot first under certain circumstances and increasingly credible missile capabilities to make good on their plans in a crisis. Threats to kill the North Korean leadership, too, raise the risk of nuclear escalation—both deliberate and inadvertent—by Pyongyang.

Despite the apparent stability concerns stemming from both sides' pursuit of ever-more-advanced conventional missile capabilities, numerous South Korean defense analysts underscore that Seoul's pursuit of the K3 suite is necessary given the country's non-nuclear status and the necessity of deterring North Korean attacks.⁶⁹ Despite its alliance with the United States, Seoul sees ample reason to continue investing in robust autonomous strike capabilities, partly concerned about the long-term reliability of the United States as an ally. Additionally, the United States has been supportive of Seoul's K3 efforts. While some experts in South Korea may concede that these capabilities could contribute to a heightened risk of escalation with North Korea, they nevertheless underscore the country's dire strategic environment in justifying Seoul's investments in strike systems. After North Korea's openly acknowledged pursuit of tactical nuclear weapons became apparent in 2021, this view has further ossified, particularly under the conservative Yoon administration. Moreover, many policymakers and analysts in Seoul largely reject the logic that South Korea's capabilities could contribute to a spiral dynamic with North Korea; instead, they assert that effective demonstrations of an ability to preemptively limit damage from Pyongyang's various conventional and nuclear-capable missile systems (Kill Chain) and an ability to deliver retaliatory strikes against the North Korean leadership (KMPR) will enhance deterrence.

South Korean progressives, who generally favor strategies of engagement toward North Korea, have nevertheless also supported these investments. Former president Moon not only sustained the K3 suite of capabilities but oversaw a substantial increase in defense spending compared to his two conservative predecessors.⁷⁰ Even as the Moon administration pursued

diplomacy with North Korea, South Korea’s defense spending saw year-on-year increases of 7 percent in 2018 and 8.2 percent in 2019 (see figure 4).⁷¹ An important driver of this spending was the stated interest of the Moon administration—consistent with earlier progressive administrations—in “the early takeover of wartime operational control.”⁷² One of the peculiarities of the U.S.–South Korea alliance is that the United States would maintain wartime operational control (OPCON) of the military forces of both sides. The two countries have agreed to transfer wartime operational control to South Korea eventually, but this is now premised on the Conditions Based OPCON Transition Plan. At their forty-sixth Security Consultative Meeting in 2014, the two countries’ defense ministers agreed that the transition would take place when “critical ROK and Alliance military capabilities are secured and the security environment on the Korean Peninsula and the region is conducive to a stable OPCON transition.”⁷³ Seoul’s K3 systems are among the set of capabilities—including broader advances in command, control, communications, and intelligence, surveillance, and reconnaissance—that will be critical to realizing a conditions-based OPCON transfer. South Korean progressives, while generally supportive of the alliance with the United States, seek OPCON transfer as a matter of national sovereignty. Separately, progressive leaders have also emphasized that defense acquisitions should benefit South Korea’s geopolitical status, implying that prestige considerations have also been prominent.⁷⁴ For these reasons, continued investments in autonomous South Korean strike capabilities have persisted despite the presidential transition between conservatives and progressives.

Figure 4. South Korean Defense Spending, 2010–2022



SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>.

Note: Data are in constant 2021 U.S. dollars.

Exports and Long-Term Hedging

Two final factors are prominent drivers of ongoing South Korean investments in missile technologies. The first concerns Seoul's general ambitions to become a prominent defense exporter. While South Korea is a member of the MTCR and thereby commits—albeit in a politically rather than legally binding manner—to exercise a “strong presumption of denial” concerning transfers of complete longer-range missile systems capable of delivering payloads in excess of 500 kilograms to more than 300 kilometers, its defense industry has otherwise stepped up efforts to develop shorter-range systems that are competitive globally. The K239 Chunmoo, a launcher for sub-MTCR-Category-1-class missiles, for instance, is being procured by the Polish military.⁷⁵ Seoul has also undertaken efforts to substitute certain imported missile capabilities with indigenous designs that may be partially reverse engineered. A prominent example is a new air-to-ground cruise missile that was first demonstrated by the South Korean Ministry of National Defense in late 2021. That missile physically resembles and appeared to perform similarly to the German-Swedish Taurus KEPD 350K air-launched cruise missile that Seoul first obtained in 2016.⁷⁶

A final driver of missile investments in Seoul pertains to long-term hedging in an uncertain security environment in Northeast Asia. For instance, in September 2021, South Korea revealed a new supersonic anti-ship cruise missile⁷⁷—a capability that is far in excess of what would be qualitatively necessary to hold North Korean surface ships at risk. This capability was widely perceived as one that South Korea could bring to bear in a potential future naval clash with China,⁷⁸ a growing concern for both progressives and conservatives in Seoul, and possibly even with Japan. In September 2021, South Korea also became the first non-nuclear state in the world to develop and test a submarine-launched ballistic missile (SLBM), the Hyunmoo-4-4, and the only state to deploy conventional SLBMs.⁷⁹ While Seoul's nominal reason for this capability is to render its KMPR strategy more credible by communicating to Pyongyang that it would have the means to retaliate against North Korea's leadership even if its ground-launched missile capabilities were destroyed in the course of nuclear strikes, the Hyunmoo-4-4 has raised nuclear hedging concerns. While a conventional SLBM may supplement the KMPR strategy, it would be a natural delivery system for potential nuclear payloads in the future. Amid growing public and elite interest in nuclear weapons acquisition amid North Korea's quickly advancing missile capabilities,⁸⁰ Seoul will be well positioned insofar as delivery systems are concerned should it seek to procure nuclear weapons in the future.

NORTH KOREA

Although it is among the most resource-constrained states in East Asia, North Korea possesses a formidable array of ballistic and cruise missiles, many of which are capable of delivering nuclear payloads. While the country's initial efforts at procuring a missile arsenal began with reverse engineering rudimentary Scud-type liquid-fueled ballistic missiles in the late 1970s,⁸¹ Pyongyang today possesses ballistic and cruise missiles of all ranges, deliverable via a variety of mobile platforms. Beginning in the mid-2010s, North Korea's missile capabilities saw substantial qualitative leaps. Between 2015 and 2020, North Korea crossed several important missile development thresholds, demonstrating its first intermediate- and intercontinental-range ballistic missiles, SLBMs, endoatmospheric maneuvering ballistic missiles, and advanced active and passive missile guidance capabilities.⁸² In January 2021, North Korean leader Kim outlined a wide-ranging set of military modernization objectives at the Eighth Party Congress of the Workers' Party of Korea, a prominent political event in the North Korean political system.⁸³ The objectives included a substantial focus on regional delivery systems for "tactical" nuclear weapons.⁸⁴ For example, he called for the development and testing of hypersonic boost-glide systems and long-range cruise missiles, among other capabilities. This military modernization, presented under a broader five-year national plan, remains underway and is expected to last until at least early 2026. North Korea's missile capabilities—especially in conjunction with nuclear weapons—have contributed sharply to increasing threat perceptions in Japan, South Korea, and the United States. Pyongyang relies on its nuclear forces as an important offset capability to cope with the qualitatively superior conventional forces fielded by the United States and its allies.

Drivers of North Korean Missile Development

A primary driver of North Korea's missile development efforts over several decades has been its interest in developing a reliable and survivable means of delivery for nuclear weapons. As the world's newest nuclear-armed state, North Korea has opted for ground-launched, road-mobile ballistic missiles as its preferred mode of delivery for nuclear weapons across all ranges—paralleling its choice for deep conventional strikes. Pyongyang has traditionally justified its pursuit of nuclear weapons as a means of existential insurance against what it perceives as long-standing hostility by the United States. Though the pursuit of credible nuclear deterrence has been the primary driver of North Korea's missile development efforts more recently, Pyongyang has also put priority on enhanced conventional missile capabilities, primarily with short- and medium-range systems, for warfighting ends below the nuclear threshold if necessary. Indeed, North Korea's pursuit of missile technology predates its efforts to seek nuclear weapons. However, between the mid-1980s and 2017, North Korean missile flight-testing primarily focused on developing credible strategic nuclear weapons delivery systems; this effort coincided with six nuclear explosive tests conducted between October 2006 and September 2017 and the test launching of long-range missiles of varying

designs. In 2017, North Korea for the first time demonstrated on lofted trajectories two types of liquid-propellant-based ICBMs, the Hwasong-14 and the Hwasong-15. Each of these missiles incorporated liquid propellant engines first flight-tested in an intermediate-range ballistic missile, the Hwasong-12.

To offset its long-standing qualitative conventional military disadvantages against U.S. and South Korean forces, North Korea has reserved the right to use nuclear weapons first. A 2013 law, adopted by the country's Supreme People's Assembly (a parliament-like body), codified two roles for North Korea's nuclear weapons: to "deter" general war and, should deterrence fail, "repel" an invasion of its territory. Kim has repeated this framing, including prominently during an April 2022 military parade.⁸⁵ An update to the 2013 law,⁸⁶ promulgated in 2022, reaffirmed these roles for nuclear weapons while outlining five sets of conditions under which Pyongyang could resort to the first use of nuclear weapons (see box 1).

Box 1. Five Conditions for North Korea's First Use of Nuclear Weapons

North Korean law offers these five conditions (official English translation).

- 1) In case an attack by nuclear weapons or other weapons of mass destruction has been launched or the like is judged to be on the horizon;
- 2) In case a nuclear or non-nuclear attack by hostile forces on the state leadership and the command of the state's nuclear forces has been launched or to be on the horizon is judged;
- 3) In case a fatal military attack against important strategic objects of the state has been launched or the like is judged to be on the horizon;
- 4) In case the operation for preventing the expansion and protraction of a war and taking the initiative in the war is inevitably needed;
- 5) In other case an inevitable situation in which it is compelled to respond by nuclear weapons alone to the catastrophic crisis over the existence of the state and safety of the people is created.

From "Law on DPRK's Policy on Nuclear Forces Promulgated," KCNA Watch, September 9, 2022, <https://kcnawatch.org/newstream/1662955323-991993754/law-on-dprks-policy-on-nuclear-forces-promulgated>.

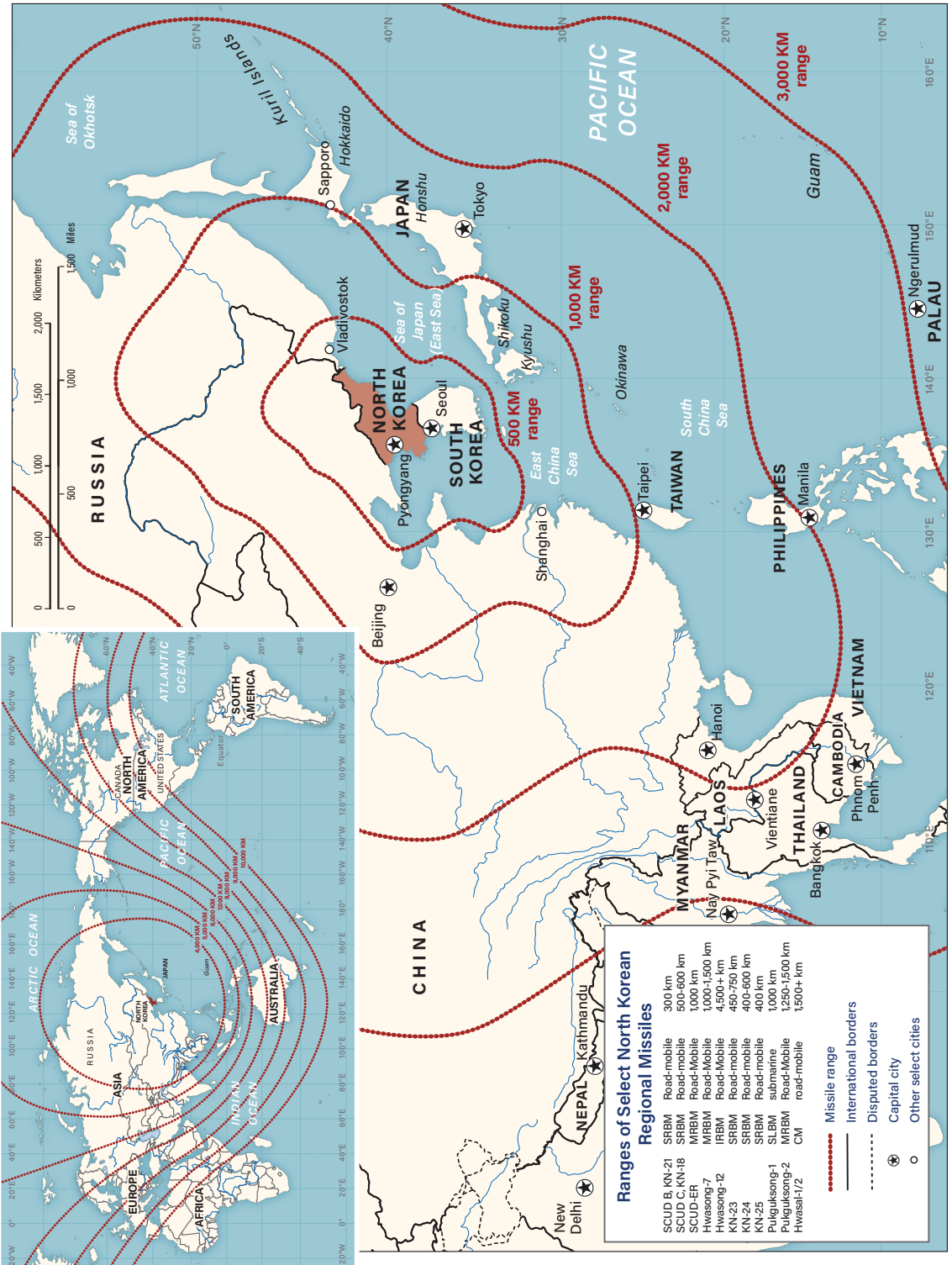
The conditions, as described in the official English translation of the updated law released by North Korea, are sufficiently expansive to allow for nuclear first use under a range of scenarios. Pyongyang has signaled through its missile tests that it would likely employ nuclear weapons against targets such as ports, airfields, and command and control nodes, to degrade U.S. expeditionary military operations and otherwise blunt the warfighting capability of the U.S.-South Korea alliance. The same updated law in 2022 noted that North Korea would automatically and immediately release its nuclear weapons should its leadership or command and control systems be deliberately attacked.

Dual-Capable Missiles and Tactical Nuclear Weapons

At the Eighth Party Congress of the Workers' Party of Korea, Kim for the first time declared an intent to develop "tactical" nuclear weapons. No universal definition of tactical nuclear weapons exists, and Kim did not specify what he meant at the time.⁸⁷ April 2022 was the first time North Korea demonstrated a delivery system that it ascribed a tactical nuclear delivery role to; the tested system was a close-range ballistic missile with a demonstrated range of 110 kilometers. Later that year, North Korea carried out a spate of missile launches that it described as operational exercises for units charged with tactical nuclear operations. These launches featured a spectrum of short-range ballistic missiles, medium-range cruise missiles, and one intermediate-range ballistic missile, suggesting that Pyongyang may be ascribing a tactical role to any missiles capable of ranging targets in the Indo-Pacific theater, including the U.S. territory of Guam (see map 3).

Tactical nuclear weapons in the traditional sense (lower-yield weapons on short-range delivery systems) would be a logical pursuit for a state that has sought to offset its conventional military inferiorities vis-à-vis its adversaries by resorting to credible threats of early nuclear use, as North Korea has. Nevertheless, the pursuit of these weapons, which will broadly coincide with the quantitative growth of North Korea's strategic nuclear warhead stockpile, introduces new risks. For instance, while North Korea has to date maintained assertive command over its nuclear forces and favored negative controls (for instance, procedures and technical solutions to ensure that nuclear weapons are never used without proper authorization), tactical nuclear weapons are likely to introduce strong incentives for the country's leadership to consider the delegation of nuclear use authority—if not in peacetime, then in a crisis.⁸⁸ This, combined with an emphasis on conventional counterforce targeting and potential preemption by Pyongyang's adversaries, could lead to tremendous incentives to use nuclear weapons early in a crisis. Furthermore, while North Korea is thought to currently store its nuclear warheads at a single site,⁸⁹ tactical nuclear weapons deployment could lead to incentives to disperse warheads, including at known missile operating bases around the country. Because these bases would likely feature commingled nuclear and conventional missiles and support vehicles, any attacks on such sites could be misperceived by the North Korean leadership as the start of a broader, disarming counterforce strike, generating strong

Map 3. Range of Select North Korean Regional Missiles



incentives for nuclear use. While North Korea may disperse and conceal its nuclear forces in anticipation of a conventional war, a general lack of strategic situational awareness capabilities would still give Pyongyang reason to fear whether its capabilities would remain sufficiently survivable amid efforts by the United States and its allies to attrite its missile forces. These developments have accelerated efforts in South Korea and, more recently, in Japan to develop plans and capabilities to target North Korean missile launchers and associated infrastructure.

Focus on Survivability and Responsiveness

Trend lines in North Korea's missile development efforts point to a focus on improving prelaunch and postlaunch survivability and the general responsiveness of its missile forces. These imperatives are a direct result of Pyongyang's own perceived conventional military weaknesses, its broader lack of strategic situational awareness capabilities, and concerns about the possibility of conventional preemptive attacks by South Korea and the United States (and increasingly Japan). With regard to survivability, Pyongyang has advanced its missile capabilities in several ways. The preponderance of its short-range missile testing since 2017, for instance, has involved solid-propellant missiles. Compared to Pyongyang's older arsenal of liquid-propellant, Scud-type missiles, these newer missiles are manufactured with the propellant-oxidizer mix cast directly into the airframe, obviating the need for fueling prior to launch. This reduces the need for supporting fueling vehicles, thereby decreasing

the signature of field-deployed mobile missile units on overhead optical satellites, and simultaneously removes the need for a missile to remain stationary while being fueled, which makes them vulnerable to a preemptive strike if detected. North Korea has also started to base short-range missiles on rail-mobile launchers and emphasized the promptness of its ability to launch missiles in a crisis.

Trend lines in North Korea's missile development efforts point to a focus on improving prelaunch and postlaunch survivability and the general responsiveness of its missile forces.

To further improve prelaunch survivability, North Korea has started to manufacture at scale tracked chassis missile launchers that are capable of carrying out launches from unpaved roads and entirely off-road locations. This ostensibly complicates tracking and targeting for its adversaries, who can no longer rely on tracking missile launchers along the relatively modest paved road networks in the country. Pyongyang has also expanded its extensive network of underground facilities, tunnels, and drive-through missile shelters to complicate adversary tracking of its mobile missile launchers. In 2022, North Korea also indicated that it would begin basing certain missiles in inland lakes, though its actual adoption of such a basing mode has yet to be confirmed.⁹⁰

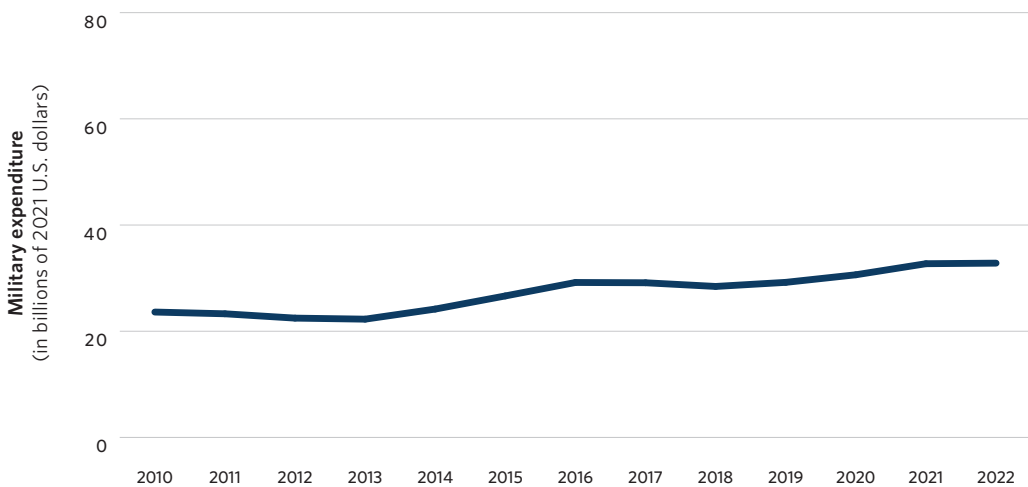
A second set of survivability improvements concerns the defeat of U.S. and allied missile defense capabilities. While the quantitative expansion of North Korea's missile forces poses a significant challenge for U.S. and allied theater missile defense capabilities, which are at risk of being overwhelmed with saturation strikes and salvo attacks, Pyongyang is also investing in qualitative means of stressing and defeating missile defenses. Efforts in this area have included investments in maneuvering missile payloads, including HGVs, MaRVs, and cruise missiles. North Korea has also devoted particular attention to endoatmospheric, aeroballistic short-range ballistic missiles that may exploit a perceived gap between the altitudinal limits of certain types of missile defense interceptors known to have been deployed on South Korean soil.⁹¹ These investments are, in part, a response to sustained investment in missile defense capabilities by Japan, South Korea, and the United States.

AUSTRALIA

Australia has not traditionally sought or maintained long-range precision strike missile capabilities, but this has begun to change. Intensifying threat perceptions concerning China have been a primary driver of greater Australian interest in procuring advanced missile capabilities as part of a broader strategic adjustment in the country's defense policy toward the twin objectives of assuring territorial defense while maintaining a power projection capability. The shifting approach to defense policymaking in Canberra is best seen in the changes that resulted between the country's 2016 *Defence White Paper*⁹² and its 2020 *Defence Strategic Update*,⁹³ the latter of which recognized a growing "risk of state-on-state conflict" and articulated a need for Australia to pursue a force capable of "[projecting] military power to shape our environment, deter actions against [Australian] interests and, when required, respond with effective military force." These aspirations were further refined in Australia's 2023 *Defence Strategic Review*.⁹⁴ While Australian defense spending over the last decade has remained within 1.7 and 2.0 percent of gross domestic product (GDP), it has grown in absolute terms (see figure 5).⁹⁵

Pursuant to the 1951 Australia, New Zealand, and United States Security Treaty (ANZUS Treaty), Australia is party to a collective defense arrangement with the United States and, as a result, maintains close interoperability and consultations with Washington on defense matters.⁹⁶ In 2011, as the Obama administration's pivot to Asia was beginning to take

Figure 5. Australian Defense Spending, 2010–2022



Source: SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>.

Note: Data are in constant 2021 U.S. dollars.

shape, Australia and the United States announced a series of Force Posture Initiatives, which were codified in a bilateral treaty in 2014.⁹⁷ Pursuant to the treaty, the two sides established a bilateral Force Posture Working Group to coordinate activities and advance cooperation on a range of matters. In September 2021, Australia, the United Kingdom, and the United States announced a trilateral defense-industrial partnership known as AUKUS that includes plans for cooperation on defense technologies.⁹⁸ While much attention has focused on how the AUKUS partnership gives Australia the capability to operate nuclear-powered attack submarines, it also includes considerable provisions to facilitate the procurement and indigenous production of long-range strike systems, including hypersonic weapons.⁹⁹

Accelerating Readiness

In April 2022, the government of former Australian prime minister Scott Morrison approved a plan for 3.5 billion Australian dollars (\$2.2 billion) to accelerate the “acquisition of improved weapon capabilities for the Australian Defence Force.”¹⁰⁰ Pursuant to the 2020 *Defence Strategic Update*, the specific missile capabilities this sought to fund included the U.S.-made 1,000-kilometer-range Joint Air-to-Surface Standoff Missile Extended Range (JASSM-ER); its anti-ship version, the 370-kilometer Long-Range Anti-Ship Missile (LRASM); and the dual-mode (anti-ship and land-attack), 250-kilometer Naval Strike Missile (NSM). Peter Dutton, the former Australian defense minister, said at the time that these investments were necessary for Australia due to changes in the strategic environment, requiring the Australian Defence Force to “be able to hold potential adversary forces and infrastructure at risk from a greater distance.”¹⁰¹ JASSM-ER/LRASM will arm the Australian FA-18F Super Hornet fighter aircraft and, eventually, the F-35A Lightning II fighter aircraft. The NSM will replace existing Harpoon anti-ship missiles on ANZAC-class frigates and Hobart-class destroyers. The Australian Department of Defence notes that the NSM would represent a “significant enhancement” of capability over the Harpoon due to the fact that it would “more than [double] the current maritime strike range of our frigates and destroyers.” Australia will also purchase U.S.-made 1,600+ kilometer Tomahawk Block IV and Block V land-attack cruise missiles for its Hobart-class destroyers, enabling its “maritime assets to strike land targets at greater distances, with better precision.”¹⁰²

Finally, Canberra seeks new land-based precision strike missiles, which will be tasked with “destroying, neutralising and suppressing [*sic*] diverse targets from over 400 km.”¹⁰³ This requirement will be met by current and future increments of the U.S.-made Precision Strike Missile (PrSM). Australia’s 2020 *Defence Strategic Update* also notes that the country will seek “self-reliant geospatial-information and intelligence capability,” in part to “support precision guided weapons.”¹⁰⁴ Despite a political transition in 2022 from a Liberal Party government to a Labor Party one under Prime Minister Anthony Albanese, Australia’s broader defense orientation has remained unchanged—as has Canberra’s enthusiasm for coordinating with the United Kingdom and the United States under the AUKUS arrangement.

Apart from its own investments in long-range strike capabilities, Australia is substantially enhancing its bilateral cooperation with the United States under the Force Posture Initiatives. A particularly notable initiative in this area is a bilateral plan to support new U.S. long-range bomber support facilities in northern Australia, the establishment of which has been ongoing since 2020. (U.S. bombers have trained with the Royal Australian Air Force and spent more time deployed to Australian bases.¹⁰⁵) Australia's strategic location in the Indo-Pacific has been a particular draw for the United States, which has attempted to improve the survivability of its forward-deployed bomber forces in Asia by seeking additional basing facilities beyond those available in Guam and Hawaii in the Pacific and Diego Garcia in the Indian Ocean. New and dedicated facilities in Australia to fuel bombers, maintain conventional munitions stocks, conduct maintenance, and house personnel would improve the flexibility of U.S. bomber operations in the Indo-Pacific. Notably, unlike the U.S. territory of Guam, the city of Darwin in northern Australia likely falls out of the range of

Chinese ground-launched, theater-range strike systems such as the DF-26 intermediate-range ballistic missile. Australia's geographic advantage may be blunted as China proceeds to develop potentially longer-range conventional strike systems, nearing if not exceeding the traditional intercontinental-range threshold of 5,500 kilometers, but Australian and U.S. military planners may believe that the added targeting requirements for China may enhance general deterrence.

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Under AUKUS specifically, Australia, the United Kingdom, and the United States are planning to initiate new forms of defense-industrial cooperation on hypersonic missiles, though in September 2023 specifics remained sparse. Cooperation in this area between Washington and Canberra dates back to the late 2000s, when Australia's Defence Science and Technology Group and the U.S. Air Force Research Laboratory began collaborating through the Hypersonic International Flight Research Experimentation (HIFiRE) program. HIFiRE, which also included the U.S. National Aeronautics and Space Administration at one point, was not explicitly oriented around missile development, however, and focused generally on the applicability of hypersonic bodies for "next generation aeronautical systems."¹⁰⁶ Building on HIFiRE, the two countries announced the Southern Cross Integrated Flight Research Experiment (SCIFiRE) initiative in 2020, focused on developing air-breathing hypersonic technologies.¹⁰⁷ (HIFiRE saw limited experimentation with scramjet technologies.¹⁰⁸) Testing pursuant to these programs has taken place at Australia's Woomera test range in the country's south.¹⁰⁹

An April 2022 summit statement by the three AUKUS leaders noted that they have committed to “commence new trilateral cooperation on hypersonics and counter-hypersonics.”¹¹⁰ While the United States is considerably more advanced among the three partners insofar as research and development for hypersonic missiles is concerned, Australia has developed a substantial base of independent scientific and technical talent in this area since the 2010s and operates seven hypersonic wind tunnels. A trilateral AUKUS hypersonic missile program may still be derived from existing or planned U.S. systems, however. Following the collapse of the 1987 INF Treaty, the United States has accelerated efforts to develop and deploy new theater-range hypersonic missiles. Apart from hypersonic missiles, Australia has committed resources to at least one such U.S. “post-INF” missile system; Canberra, under the Morrison government, committed funds to codevelop a new increment of the U.S. Army’s PrSM.¹¹¹ This agreement was cinched the month before AUKUS was formally announced in September 2021, indicating that U.S.-Australia cooperative activities on joint missile development predated the newer flagship trilateral partnership.

A final notable component of Australia’s future plans related to missiles—though not necessarily long-range missiles—concerns the 2020 *Defense Strategic Update’s* defense enterprise goals.¹¹² Specifically, Canberra has started the process of establishing a sovereign capability to manufacture advanced, guided weapons and explosive ordnance. After the announcement of the AUKUS partnership, Canberra further accelerated 1 billion Australian dollars (\$640 million) for this sovereign enterprise capability. An additional 1.5 billion Australian dollars (\$960 million) was announced for this purpose in 2023. The strategic logic driving this investment concerns Australia’s vulnerability to outside suppliers and partners to sustain its stocks of munitions that could be quickly expended in a high-intensity interstate conventional war. To mitigate these vulnerabilities, the country is working to establish a sovereign capability to quickly replenish munitions stocks. Over the long term, this sovereign manufacturing capability, combined with Canberra’s expanding talent and knowledge base, could enable the manufacture of new long-range missiles. According to Australian officials involved with the Sovereign Guided Weapons and Explosive Ordnance (GWEO) Enterprise, this initiative will remain highly dependent on access to intellectual property and data from the United States, which is not assured but may be more likely pursuant to the AUKUS partnership.¹¹³ Australian officials have also cited the intensity of munitions requirements observed in the Russia-Ukraine war as another motivator for continuing investments in GWEO.¹¹⁴

JAPAN

Among the U.S. treaty allies examined in this study, Japan is unique in its constitutional constraints on pursuing certain military capabilities. The country's constitution, drafted under U.S. occupation in the aftermath of World War II, saw Tokyo "forever renounce war" as a means of pursuing its national interests.¹¹⁵ Article Nine of the constitution proscribes Tokyo's pursuit of "war potential" and forswears the "right of belligerency." While the precise meaning of Article Nine has been reinterpreted to allow for the gradual expansion of Japan's defense capabilities and for Tokyo to play a more active—and even expeditionary—role within the context of the U.S.-Japan treaty alliance, these constitutional restraints have continued to influence debates in Japan on the types of capabilities that the country can legally procure. The dominant Liberal Democratic Party (LDP), which has ruled Japan for most of its postwar history, has seen prominent political leaders seek to reinterpret these constitutional restraints in pursuit of something akin to a normalized defense posture. The late prime minister Abe Shinzo was among the most prominent of these leaders; as Japan's longest-serving postwar prime minister over two nonconsecutive terms, Abe oversaw substantial changes to Japan's defense posture. Abe's second stint, from December 2012 to September 2020, saw military reforms, defense white papers that articulated Tokyo's threat perceptions vis-à-vis China in no uncertain terms, and prominent adjustments to the defense guidelines that underpin the U.S.-Japan alliance.¹¹⁶ In the aftermath of Russia's 2022 invasion of Ukraine and amid sharply rising threat perceptions in Tokyo concerning both China and North Korea, Tokyo promulgated an updated *National Security Strategy* and a *National Defense Strategy* that represent nothing short of a sea change in postwar Japanese defense policy and plans.

Long-range land-attack missiles, by their very nature, are generally seen as offensive capabilities, designed to destroy targets at range. As a result, they traditionally have been deemed as incompatible with Japan's constitutional constraints. A common analogy used to describe the role of Japan's military capabilities in the context of its alliance with the United States was to juxtapose Tokyo's capabilities as the "shield" to Washington's "spear." In other words, Japan would pursue exclusively defensive capabilities while enabling U.S. expeditionary military operations in Northeast Asia.¹¹⁷ Japanese officials note, however, that this was due to a policy choice by Tokyo and not a legal determination. Therefore, Tokyo's landmark 2022 *National Security Strategy* was able to endorse a call for new, longer-range missile capabilities to hold at risk adversary missile launchers and related infrastructure. In the post-Cold War era, legislative changes opened the door for Japan's Self-Defense Forces to join United Nations peacekeeping operations overseas and support U.S. forces in Afghanistan and Iraq.

The primary drivers of Japan's move toward openly pursuing long-range strike capabilities in the 2020s are growing geopolitical friction with China and serious concerns about the threat posed by North Korea's increasingly sophisticated and large nuclear and conventional

missile forces. The latter was explicitly centered in Japanese debates in the late 2010s and early 2020s on acquiring long-range strike capabilities, but concerns about China have also driven interest. For instance, Japan has moved anti-ship and anti-air missiles to four islands along its southwestern Ryukyu chain to contribute to the defense of the Senkaku Islands, which Tokyo administers but Beijing claims and calls the Diaoyu Islands. Some of these capabilities may also contribute to a Taiwan contingency,¹¹⁸ which is increasingly driving Japanese defense policy and featured prominently in the domestic debates leading up to the 2022 revised *National Security Strategy*. The United States is also involved in augmenting strike operations along the Ryukyu Islands;¹¹⁹ a new U.S. marine littoral regiment will become operational in the region by the mid-2020s and will field uncrewed Navy Marine Expeditionary Ship Interdiction System (NMESIS) launchers armed with NSMs.¹²⁰ The regiment will deploy initially on Okinawa but may expand to other islands.¹²¹

A Debate on “Strike” Capabilities

Japan began to consider the security consequences of North Korea’s burgeoning missile programs in the early 1990s. The real wake-up call for Tokyo came in 1998, when Pyongyang flew the Taepodong-1 satellite launch technology demonstrator over Japan. The overflight precipitated a sharp interest in Tokyo in missile defense. Following that demonstration, Japan and the United States began to cooperate with unprecedented closeness in developing missile defense interceptors and systems, including the SM-3 Cooperative Development Project to develop the SM-3 Block IIA variant interceptor. Faced with a growing missile threat in its neighborhood and nevertheless constrained by its constitution, Japan largely looked to missile defenses as a solution. In 2017, unprecedented qualitative breakthroughs from North Korea further shocked Japan. In August and September that year, Pyongyang flew intermediate-range Hwasong-12 ballistic missiles over Japan, marking the first time Japanese territory had been overflown with missiles explicitly characterized as designed to carry nuclear weapons. These launches prompted a serious study in Japan of whether its existing missile defense architecture, which by then had grown to include a range of capabilities on land and at sea, was fit for the task of managing North Korea’s evolving missile arsenal. In December 2017, the Abe administration finalized plans to pursue two fixed Aegis Ashore missile defense sites that could add to Tokyo’s existing missile defense coverage.¹²² After domestic political difficulties concerning the locations of these sites and public concerns about the consequences of spent interceptor stages potentially landing on populated Japanese territory, the Abe administration canceled these deployment plans in June 2020.¹²³ The overall costs of the system—and of missile defense in general as a long-term plan for coping with the threat posed by North Korean missiles—also factored into government decisionmaking in the lead-up to the decision to scrap the two sites.¹²⁴

As the plan to deploy Aegis Ashore sites moved forward between 2017 and 2020, parts of the LDP were counseling the Abe administration to consider alternatives to missile defense,

namely strike capabilities. As early as March 2017, prominent LDP members, citing a “new level of threat” from North Korea, prompted Abe to consider Japan’s pursuit of “our own capability of striking back at an enemy base, with cruise missiles for instance, to further improve deterrence and response as part of the Japan-U.S. alliance.”¹²⁵ Onodera Itsunori, who from 2012 to 2014 served as Abe’s first defense minister during his second nonconsecutive prime ministerial term, led that intra-LDP council. Onodera served again as Abe’s defense minister from 2017 to 2018, overseeing the final decision to move ahead with Aegis Ashore.¹²⁶ Following the cancellation of the Aegis Ashore procurement plan in June 2020, Abe requested that Onodera lead another LDP policy committee to study alternative missile defeat plans, including the strike capability idea that the former defense minister had championed in early 2017. Like in early 2017, the committee returned with a recommendation to seek long-range strike capabilities: “Our country needs to consider ways to strengthen deterrence, including having the capability to halt ballistic missile attacks within the territory of our adversaries,” the proposal document said.¹²⁷ The committee was careful in its choice of verb, opting for the considerably neutral “halt” and eschewing terms that could imply offensive intent, such as “attack.” The constitutionality matter was largely treated as settled within the LDP, as long as the intent was to forestall an “imminent” attack. The precedent here was a 1956 statement by former Japanese prime minister Hatoyama Ichiro, who had once said that Japan could take “minimum measures unavoidably necessary,” when no other means were available, to forestall an “imminent illegal invasion.”¹²⁸ Speaking before the Diet, Japan’s bicameral legislature, Hatoyama also expressed the view that “I cannot believe that it is the constitution’s intention for us to sit and wait for our own destruction.” Between Hatoyama’s 1956 statements and the 2020 Onodera committee recommendations, several private government-commissioned studies and remarks by public figures, including Abe, hinted at long-running interest in Japan in acquiring such capabilities—even prior to North Korea’s first nuclear test in October 2006.¹²⁹

These Japanese debates, particularly between 2017 and 2022, were often presented in international media as concerning a “strike capability.” Officially, Japanese experts and politicians preferred to allude to a “counter-attack capability” (or counter-strike capability), implicitly indicating that Tokyo would only seek to carry out deep strikes against an adversary’s territory once an attack on Japan was underway. This would nominally foreclose the possibility of preemptive attacks, whereby Japan would launch strikes *prior to* actually suffering an adversary’s strikes. As the plans proceeded in 2022, amid Prime Minister Kishida Fumio’s efforts to update Japan’s *National Security Strategy* and *National Defense Strategy*, the LDP addressed this issue with its more restrained coalition partner, the Komeito party. October 2022 consultations between the two parties, however, revealed reluctance on the part of the LDP to fully clarify the Japanese government’s interpretation of what the initiation of an adversary’s attack might mean—with the intention of augmenting deterrence through manifesting ambiguity in an adversary’s decisionmaking calculus.¹³⁰ Komeito, however, sought to limit the range of scenarios in which Japan could carry out strikes as well as the

targets of such strikes. A notable divergence between the two concerned whether “command and control functions” should be acceptable targets for Japanese strikes.¹³¹ The final 2022 *National Security Strategy* and *National Defense Strategy* leave this matter explicitly unaddressed, preserving a certain degree of ambiguity that may be deliberate.

Notably, Japan’s internal debates on acquiring these capabilities accelerated largely in parallel to the disintegration of the INF Treaty (discussed in a subsequent chapter). Despite the possibility of a newly unconstrained U.S. missile arsenal becoming available for basing on Japanese soil at some point in the mid-to-late 2020s, Japanese defense experts and officials appeared to favor an independent capability, with some seeing a compelling military logic to Japan’s possession of such weapons and others simply seeing U.S. missiles on Japanese soil as a bridge too far, politically speaking.¹³² During the Abe-era consultations on missile defeat strategies, including missile defense and strike capabilities, prominent Japanese defense officials indicated that Tokyo should be prepared to hedge against an uncertain future—both in terms of regional threat perceptions and in terms of the U.S.-Japan alliance—by building capabilities that would allow it to, in effect, limit damage and attrite an adversary’s missile forces with long-range strike weapons of its own.¹³³ The acquisition of such capabilities could not only augment deterrence of attacks on Japanese territory but also limit the scope of damage to Japan if deterrence failed. Furthermore, Japanese officials appeared to believe that such capabilities would be largely complementary to U.S. expeditionary and strike capabilities in the region, including possible conventional missile systems that the United States might deploy to Asia in the aftermath of the INF Treaty. Finally, though rarely expressed in public, Japanese officials bore concerns about the reliability of the United States as an ally—particularly under Trump’s erratic presidency between 2017 and 2021. In the course of 2020 debates on Japan’s strike capability, Nakatani Gen, a former LDP defense minister, alluded to these concerns, noting that Tokyo “cannot take for granted that the United States will retaliate if we are attacked,” and consequently Japan must “enhance deterrence by developing our own retaliatory capability.”¹³⁴

Pursuit of New Capabilities

Despite its constitutional constraints, Japan does possess notable missile capabilities—although none that were deployed as of October 2023 were capable of carrying out deep strikes on targets within China or North Korea from Japanese territory. The most prominent indigenous, ground-based Japanese missile system is the 180-kilometer-range Type 88/SSM-1 anti-ship cruise missile system. The Type 12, an improvement to the Type 88, was introduced in 2015 and features an advanced guidance package and greater precision alongside a modest range extension to 200 kilometers. Press reports prior to the finalization of the Kishida administration’s *National Security Strategy* suggested that the Japanese Ministry of Defense planned to authorize research, development, testing, and evaluation of longer-range land-attack variants of the Type 12, with the ceiling on possible range ex-

tensions surpassing 1,000 kilometers.¹³⁵ This was ultimately endorsed by the government, but the technical work necessary to extend the range of these missiles may take until early 2026.¹³⁶ Japan's 2021 defense budget included 33.5 billion yen (\$306 million in 2021 U.S. dollars) for the development of an extended-range Type 12 variant.¹³⁷ Press reports have also underscored that the Japanese Ministry of Defense is exploring the possibility of developing hypersonic land-attack missiles capable of holding at risk targets up to 3,000 kilometers away, which would allow deep strikes into much of mainland China.¹³⁸ If based on Ishigaki Island, which is 400 kilometers southwest of Okinawa on the first island chain, such missiles would be able to range all known PLARF brigades with the exception of Brigade 646 in Xinjiang and China's new fixed ICBM silo fields. These missiles, if pursued, are to be developed by the mid-2030s. Range extension efforts will likely be paired with efforts to base these cruise missiles on new launch platforms, including fighter aircraft and surface ships of the Japan Maritime Self-Defense Force.¹³⁹ Tokyo is also likely to explore the emplacement of long-range cruise missiles on submarines.¹⁴⁰ The Japanese government has earmarked 5 trillion yen (\$37 billion in 2022 U.S. dollars) for the procurement of new long-range missiles between the 2023 and 2027 fiscal years.¹⁴¹ Japanese analysts who support these efforts underscore trends in regional missile proliferation in Northeast Asia, particularly the rapid growth of Chinese, North Korean, and even South Korean missiles capable of ranging in excess of a few hundred kilometers.¹⁴² Beyond its indigenous capabilities, Japan's 2018 *National Defense Program Guidelines* and Medium Term Defense Program endorsed the procurement of the U.S.-made JASSM/LRASM air-launched cruise missiles and the Norwegian-U.S.-made air-launched Joint Strike Missile.¹⁴³

The United States recently has been supportive of Japanese efforts to acquire long-range strike capabilities. Within the confines of the alliance, Japan's missile capabilities are being increasingly integrated with U.S. airpower. For instance, the two sides have carried out joint exercises to study how Japanese anti-ship missile units in the first island chain could create a favorable operational environment for U.S. airpower.¹⁴⁴ In the aftermath of

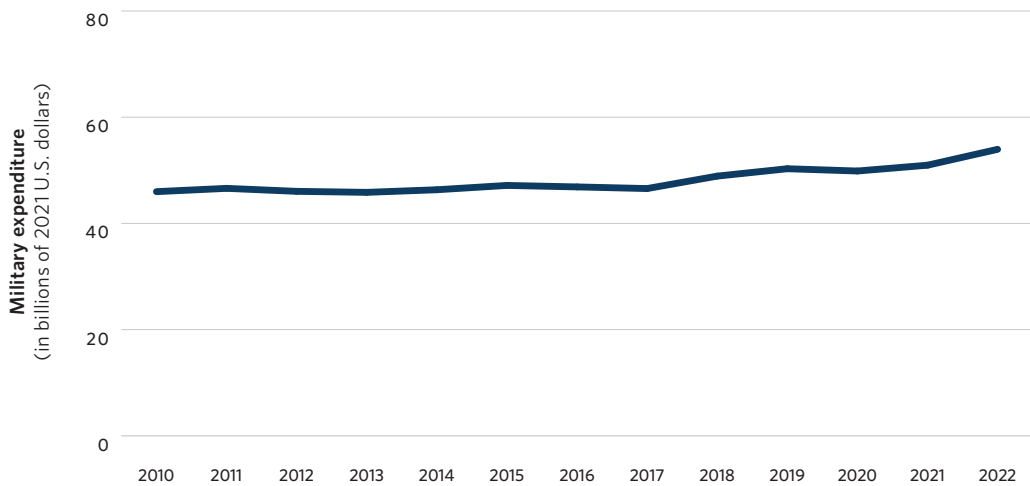
The United States recently has been supportive of Japanese efforts to acquire long-range strike capabilities.

the United States leaving the INF Treaty, some U.S. officials also encouraged Tokyo to potentially host or procure new U.S. missiles. Marshall Billingslea, the former U.S. presidential envoy for arms control in the Trump administration, for instance, described the U.S. Tomahawk land-attack cruise missile as “exactly the kind of de-

fensive capability that countries such as Japan will want and will need for the future.”¹⁴⁵ While the United States and Japan did not formally consult on the basing of U.S. missiles on Japanese soil immediately after the INF Treaty disintegrated, Trump administration officials raised the issue, underscoring in particular China's growing missile capabilities.¹⁴⁶ Despite that, since the end of the INF Treaty, Japan's determination to buttress its own

strike capabilities has only expanded—with little added interest in the possibility of hosting U.S. missiles.¹⁴⁷ Procuring U.S. missiles, however, is part of Tokyo’s plans. As part of its broader defense spending outlays through the 2027 fiscal year (see figure 6), Japan plans to spend more than \$2 billion on U.S. Tomahawk land-attack cruise missiles for emplacement on certain Maritime Self-Defense Force ships.¹⁴⁸ As of 2023, Tokyo’s plans included the procurement of 400 Tomahawk land-attack cruise missiles.¹⁴⁹

Figure 6. Japanese Defense Spending, 2010–2022



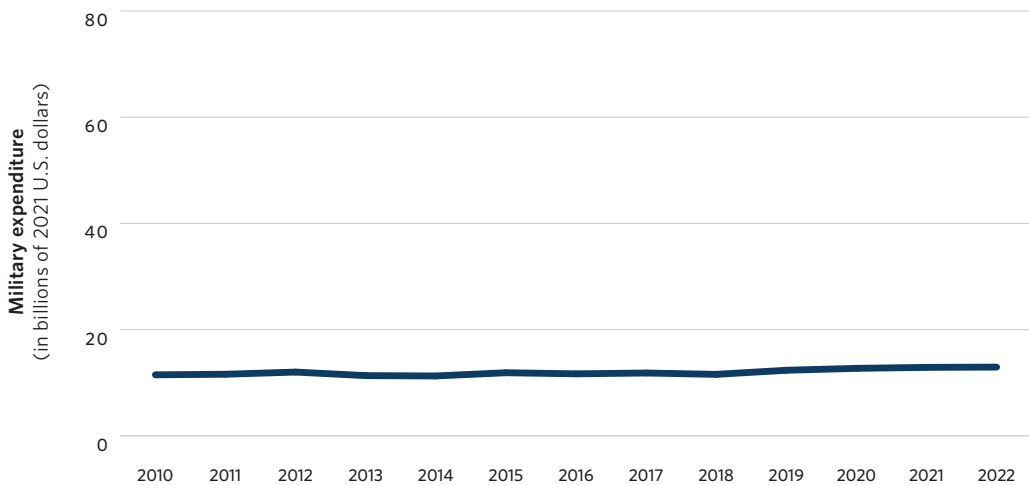
Source: SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>.

Note: Data are in constant 2021 U.S. dollars.

TAIWAN

Taiwan has maintained a long-standing interest in the pursuit of ballistic and cruise missiles (see figure 7), with initial efforts at indigenously developing missile technology dating back to the 1970s. In the interest of preserving stability in the Taiwan Strait and global nonproliferation, the United States viewed a potential ballistic missile arsenal in Taiwan as destabilizing, particularly in the 1970s and 1980s, and discouraged its development.¹⁵⁰ Taipei thereafter largely focused its efforts on cruise missiles—especially those that could be considered as defensive platforms against a Chinese amphibious invasion attempt, such as anti-ship cruise missiles—and surface-to-air missiles, which received the preponderance of Taiwanese research and development efforts as a result. The Hsiung Feng I/IA anti-ship cruise missiles and Tien-Kung 1 surface-to-air missile system were two early Taiwanese missile systems, each precipitating a series of anti-ship cruise missiles and surface-to-air missiles that remain relevant to this day. The first Hsiung Feng I anti-ship cruise missile test was carried out on July 27, 1975.¹⁵¹ Beginning in the late-1960s, Taiwan started flight-testing shorter-range Kung Feng-series rocket artillery systems.

Figure 7. Taiwanese Defense Spending, 2010–2022



Source: SIPRI Military Expenditure Database, accessed October 5, 2023, <https://milex.sipri.org/sipri>.

Note: Data are in constant 2021 U.S. dollars.:

Like its reservations about South Korea's pursuit of long-range delivery systems in the 1970s, Washington was particularly concerned about Taiwanese interest in ballistic missile technologies due to concerns that Taipei might pursue nuclear weapons. Taiwan aborted its clandestine effort at building nuclear weapons in 1988 under U.S. pressure,¹⁵² and it further abandoned efforts to build a nearly 1,000-kilometer-range ballistic missile system under the Tien Ma program.¹⁵³ Despite this, Taiwan has sustained a substantial base of domestic knowledge on missile development, focused on cruise missiles.

Emphasis on Offense in Taiwanese Missile Strategy

The primary driver of Taiwanese investments in missiles has been the long-perceived threat of an invasion of its territory from the People's Republic of China. As China's own ballistic and cruise missile capabilities expanded in the 1980s and 1990s, Taiwan largely saw a need to keep pace with its own capabilities—particularly those that would be able deliver tactical and strategic effects against fixed and mobile targets in Chinese territory. Despite U.S. encouragement during this time to invest in missile defenses, Taiwanese policymakers almost universally saw offensive missile capabilities as the most cost-effective means to deter Beijing.¹⁵⁴ By the 1990s, Taiwan's substantial investments in indigenous missile research and development efforts and growing expertise likely also buttressed Taipei's belief that it could sustain and scale an indigenous missile force without necessarily relying on the United States. Following the U.S. normalization of diplomatic relations with China in 1979, Taiwan ceased to benefit from the formal, treaty-codified U.S. extended deterrence assurances that had been in place since 1954.¹⁵⁵ In 1979, the U.S. Congress enacted the Taiwan Relations Act, which has since governed the unofficial relationship between the United States and Taiwan and included a commitment to “make available to Taiwan such defense articles and defense services in such quantity as may be necessary to enable Taiwan to maintain a sufficient self-defense capacity.”¹⁵⁶ The Ronald Reagan administration extended six assurances to Taipei that included a commitment to continue arms sales to Taiwan indefinitely and without consultation with Beijing.¹⁵⁷

Despite these continuing U.S. statements of support, policymakers in Taipei still saw a necessity to continue investing in missile capabilities. The locus of indigenous expertise in missile technologies and missile development in Taiwan largely rests with the National Chung-Shan Institute of Science and Technology (NCSIST). NCSIST undertakes defense research and development activities relating to a range of technologies with defense applications. Through the 1990s, while interest in ballistic missile defenses appeared to grow around the world following U.S. claims concerning the role of Patriot missile defense systems in the first Gulf War, Taipei remained skeptical of the cost effectiveness of missile defense. (U.S. claims concerning the performance of Patriot against Scuds in that war were later shown to have been significantly exaggerated.¹⁵⁸) In 1995, then Taiwanese defense minister Chiang Chung-ling underscored another component of Taipei's reasoning about

the value of missile systems, publicly hinting before Taiwanese legislators that such capabilities could contribute to a campaign of preemption against Chinese missile launchers: “Undoubtedly, the best defense strategy is to attack . . . the best defense measure is to destroy the [Chinese] M-class missiles before they are launched.”¹⁵⁹ At the time, this was an unusually transparent and authoritative statement from a Taiwanese official on the purpose of Taipei’s continuing investments in missile capabilities. Taiwan had maintained substantial opacity regarding its missile development efforts at NCSIST; this opacity persisted for decades and has only recently begun to give way to greater transparency. Less than a year after Chiang’s public remarks, in the course of what would come to be known as the Third Taiwan Strait Crisis, China’s Second Artillery Corps fired DF-15 ballistic missiles during live-fire exercises, spotlighting Beijing’s missile capabilities and reaffirming Taiwanese threat perceptions.¹⁶⁰ In the aftermath of the crisis, Taiwan expanded its missile-related research and development activities, which included efforts to convert anti-ship cruise missiles into land-attack cruise missiles.¹⁶¹

In the twenty-five years since the Third Taiwan Strait Crisis, China’s ballistic and cruise missile arsenal and its conventional military capabilities more generally have grown substantially. Since the 2016 election in Taiwan, when Democratic Progressive Party candidate Tsai Ing-wen became president, cross-strait relations have declined precipitously. China views Tsai and her party as insufficiently committed to Beijing’s interpretation of the One China principle and as positively disposed toward formal independence for Taiwan. Moreover, intensifying geopolitical rivalry between the United States and China has largely shed Washington of its earlier encouragement of restraint concerning the pursuit of strike capabilities by Taipei. Under both the Trump and Biden administrations, the United States has continued to support robust defensive arms sales to Taiwan and has actively encouraged Taipei to pursue capabilities that could contribute to deterrence by denial of a Chinese amphibious invasion through the pursuit of anti-ship cruise missiles, among other weapon systems—but not dedicated land-attack systems. Even before these developments, by the end of the 2010s, analyses of the cross-strait military balance emphasized Taiwan’s limited ability to cope with the capabilities China could bring to bear in an invasion scenario.¹⁶²

Ongoing Investments in Missiles

Due to Taipei’s general restraint in the pursuit of ballistic missile technologies, most of its deployed missiles and missiles under development are cruise missiles of varying speed and sophistication. The most prominent of Taiwan’s operational missiles is the Hsiung Feng IIE land-attack cruise missile, which features a 600-kilometer range, giving it the ability to hold at risk targets well within mainland China (primarily Fujian Province, but also parts of Zhejiang, Guangdong, and Jiangxi Provinces). The Hsiung Feng IIE is the primary deployed long-range surface-attack missile; another missile, known as Yun Feng (discussed later), is under development and will allow Taiwan to hold at risk targets deeper in mainland China.

The bulk of Taiwan's other indigenous operational missiles are anti-ship cruise missiles and air-to-surface cruise missiles. These include both the Hsiung Feng II and Hsiung Feng III anti-ship cruise missiles, each of which is a close-range missile (120–150 kilometers), and the air-launched Wan Chien cruise missile, with a slightly longer, 240-kilometer range. The Wan Chien's range can be practically extended if its launch platform, the F-CK-1 C/D Ching-kuo fighter, is able to leave Taiwanese airspace in the direction of mainland China. (This airspace would be highly contested in times of conflict, and Taiwanese fighters would be vulnerable to ship- and shore-based air defenses.) Taiwan's lone, known deployed ballistic missile capability is in the form of the solid-propellant, short-range Tien Chi missile, which is thought to be derived from a surface-to-air missile.¹⁶³ Sources vary in range assessments of the Tien Chi, but it is probable that the missile could deliver a light, conventional high-explosive payload to around 300 kilometers,¹⁶⁴ allowing for strikes on mainland Chinese targets near the coast from forward island bases.

Taiwan has traditionally been concerned about the survivability of its own missile force, particularly as China's long-range precision strike capabilities have grown in the post-Cold War era. Taipei has generally been hesitant to publicize details about its missile capabilities. Until recently, images of prominent Taiwanese missile systems, such as the Hsiung Feng III, were not released by official sources. At one point, Taiwan explored the possibility of disguising Hsiung Feng IIE mobile launchers as commercial delivery vehicles—a decision that one Taiwanese military official would later describe to the press as “idiotic” and “embarrassing” following disclosures by open-source analysts.¹⁶⁵ Taipei has also been reluctant to confirm the existence of certain missile programs. For instance, for years, rumors swirled about a Taiwanese program, known as Yun Feng, to develop a long-range surface-to-surface missile designed to hold at risk targets deep within China. The Taiwanese military confirmed the existence of such a program in October 2021 for the first time.¹⁶⁶ The Yun Feng is not a ballistic missile system but a probable ramjet-equipped, supersonic land-attack cruise missile; it may be partially derived from the Hsiung Feng III. Taiwanese press reported that a series of Yun Feng launches took place in April 2020, but this was not officially confirmed.¹⁶⁷ In June 2022, You Si-kun, the president of Taiwan's Legislative Yuan, alluded to the ability of the Yun Feng missile to strike Beijing, implying that the missile could play the role of retaliating against China's senior political leadership in the context of an invasion.¹⁶⁸ You alluded to Russia's invasion of Ukraine, juxtaposing Taiwan's apparent ability to strike deep within China with Ukraine's relatively more limited strike capabilities.¹⁶⁹ Since 2021, Taiwan has substantially deepened its investments in missile systems, including through the passage of a supplementary defense budget in 2021.¹⁷⁰ According to a senior Taiwanese official, Taiwan's indigenous missile production is expected to surpass 1,000 missiles across all range classes in 2023.¹⁷¹

Beyond its indigenous capabilities, Taiwan continues to source a number of precision strike systems from the United States. Washington has continued to approve the sale of various missile systems to Taipei. In October 2020, the United States announced an intention to sell

135 270-kilometer AGM-84H Standoff Land Attack Missile Expanded Response (SLAM-ER);¹⁷² eleven High-Mobility Artillery Rocket Systems (HIMARS) M142 launchers,¹⁷³ along with associated munitions; and 400 124-kilometer RGM-84L-4 Harpoon Block II Surface Launched dual-mode anti-ship and land-attack missiles.¹⁷⁴ These were in addition to a package of Block I-92F shoulder-fired surface-to-air Stinger missiles and Block I-92F Stinger Fly-to-Buy missiles approved in July 2019. Additional U.S.-Taiwan cooperation may result in the joint production of U.S. weapons in Taiwan, according to officially uncorroborated press reports,¹⁷⁵ although the United States is unlikely to authorize production capabilities that would meaningfully assist Taiwan's ability to produce ballistic or cruise missiles. U.S. concern over the possible unintended transfer of intellectual property or leaks of classified information relating to certain missile systems could preclude the finalization of such an agreement. Nevertheless, U.S. interest in coproducing missiles in Taiwan in the 2020s underscores the substantial shifts in Washington's prior encouragement of restraint in Taipei, largely as a function of growing geopolitical rifts with Beijing and concerns about a deliberate invasion of Taiwan. U.S. lawmakers are further considering the acceleration of arms sales to Taiwan, including the provision of anti-ship, anti-air, and anti-tank missile systems, through the foreign military financing program.¹⁷⁶

CHAPTER 3

THE END OF THE INF TREATY AND NEW U.S. MISSILES

On August 18, 2019, U.S. Department of Defense officials gathered at the live munitions testing range San Nicolas Island off the coast of California to observe a missile test. At approximately 2:30 p.m., a cruise missile was ejected from an ordinary-looking rectangular canister. The missile flew out into the open ocean. A subsequent press release from the Department of Defense did not specify the total range covered but simply noted that the missile had “exited its ground mobile launcher and accurately impacted its target after more than 500 kilometers.”¹⁷⁷ Normally, such a test would pass with little of note, but this was not an ordinary missile test; it marked the first time in at least thirty-two years that the United States had launched a non-intercontinental missile from a ground-based launcher to a range of more than 500 kilometers. The test was a direct result of Washington’s decision, which had taken effect about two weeks prior, to leave the 1987 INF Treaty, giving it newfound freedom of maneuver with regard to missile capabilities.¹⁷⁸ With the launch, the United States made clear that the treaty’s erstwhile constraints no longer had bearing.

Although Washington maintained stocks of air- and sea-launched missiles that were outside of the INF Treaty’s scope through its life span, the arrival of new U.S. ground-launched, long-range precision strike systems to Asia will have implications for the country’s military strategy, warfighting plans, and escalation management. New U.S. deployments may have significant implications for the military balance in the Indo-Pacific—provided that Washington can find suitable territory for basing new missiles. As of 2023, no regional allies have acquiesced to basing new U.S. missiles or entered formal consultations.¹⁷⁹ For U.S. adversaries such as China and North Korea, the end of the INF Treaty removes an important

structural constraint on U.S. military power and a source of predictability. The prospect of new U.S. deployments against the backdrop of rapidly expanding allied and adversarial missile arsenals, as described in the previous chapter, deserves particular attention given the implications for regional stability. The central hinge point for regional stability and U.S. military planning, however, will continue to be the possibility of missile basing on allied territory.

THE RISE AND FALL OF THE INF TREATY

Negotiated between the United States and the Soviet Union in the final years of the Cold War, the INF Treaty was a notable first in the history of arms control because it eliminated an entire category of delivery systems. The two states permanently abjured all ground-launched ballistic and cruise missiles with ranges between 500 kilometers and 5,500 kilometers, irrespective of whether their payloads were nuclear or conventional. The treaty was originally envisaged as a means to manage concerns over missile-specific escalation risks in Europe, west of the Ural Mountains. However, allied exhortations, including by Japanese prime minister Nakasone Yasuhiro, motivated the United States to eventually seek a global scope for the treaty's proscriptions.¹⁸⁰ Over the course of the treaty's implementation through 1991, 2,692 ground-launched U.S. and Soviet missiles were destroyed.¹⁸¹ Following the collapse of the Soviet Union, the treaty's obligations were inherited by the Soviet successor states whose territories previously hosted proscribed missiles, including Belarus, Kazakhstan, Russia, Turkmenistan, Ukraine, and Uzbekistan.¹⁸² By the early 1990s, U.S.-aligned states in East Asia, as well as China, generally viewed the INF Treaty in positive terms.¹⁸³

The INF Treaty was, above all, concerned with the basing mode of regional ballistic and cruise missiles—specifically, the U.S. Pershing II and BGM-109G Gryphon GLCM and the Soviet SS-4, SS-5, and SS-20. The immutable geography of continental Europe meant that NATO and Warsaw Pact forces were not only contiguous but that such missiles could be credibly and widely deployed on ground-based launchers with a plausible case for their military utility. NATO's dual-track decision in 1979 resolved both to seek to negotiate limits and to address the apparent gap that had emerged between its own deployments and the Soviet Union's deployments of the modern, mobile, MIRVed SS-20 in the second half of the 1970s. The dual-track approach incorporated “two parallel and complementary approaches,” namely deploying U.S. missiles to Europe while seeking to use these same missiles as leverage in arms control diplomacy.¹⁸⁴ NATO concerns over the challenge that Soviet intermediate-range missiles posed to the credibility of the U.S. extended deterrent, as well as Soviet concerns over the short flight times and precision of systems such as the Pershing II, over time allowed for the treaty to manifest (with no shortage of negotiating difficulties between the two sides throughout the 1980s).

In 2014, the United States, under the Obama administration, first alleged that Russia was “in violation of its obligations under the INF Treaty not to possess, produce, or flight-test a GLCM with a range capability of 500 km to 5,500 km, or to possess or produce launchers of such missiles.”¹⁸⁵ On March 8, 2017, less than two months after Trump’s inauguration, General Paul J. Selva, the vice chairman of the U.S. Joint Chiefs of Staff, testified before U.S. lawmakers that Russia had “deployed” a missile that he assessed “violates the spirit and intent” of the INF Treaty.¹⁸⁶ Later that year, an official revealed that the missile in question was the 9M729 (NATO designation: SSC-8 Screwdriver).¹⁸⁷ Russian noncompliance with the treaty took on particular urgency for the Trump administration, which partly used the noncompliance to justify its decision to pursue a nuclear-armed sea-launched cruise missile in its 2018 *Nuclear Posture Review*.¹⁸⁸ The dispute festered between Moscow and Washington for more than two years, culminating in an announcement by Trump on October 20, 2018, that he would “terminate” the treaty. This announcement was made following a political rally in the U.S. state of Nevada,¹⁸⁹ but the United States did not formally invoke the treaty’s six-month withdrawal period until February 2, 2019.¹⁹⁰

The U.S. withdrawal from the treaty sparked concern in Europe, where the decision was not fully expected. It also raised questions about what role U.S. concern about Chinese capabilities might have played. During the initial announcement of withdrawal, Trump cited apparent concerns about China’s missiles, highlighting the country’s nonparticipation in the treaty.¹⁹¹ Long before that, senior U.S. military officials had expressed concerns about Beijing’s growing ground-launched missile capabilities. In 2017, the former commander of U.S. Pacific Command, Admiral Harry B. Harris, testified before U.S. lawmakers that the United States had “no comparable capability” to the PLARF’s “diverse missile force” in part “due to our adherence to” the INF Treaty.¹⁹² Harris added that “95% of the PLARF’s missiles would violate the INF [Treaty] if China was a signatory.”¹⁹³ Harris’s public testimony reflected the U.S. Pacific Command’s growing sense at that time that the INF Treaty was not fit for purpose in the emerging geopolitical environment in East Asia, where military competition with China may require the United States to seek capabilities that had not previously been deployed to the region. In part, growing interest in archipelagic defense strategies that would seek to deny the PLA freedom of maneuver in and around the first island chain began to grow more prominent in U.S. strategic discourse during this period, increasing interest in new ground-launched missile capabilities.¹⁹⁴

Unsurprisingly, China reacted sharply and negatively to the U.S. decision to “terminate” the INF Treaty. Shortly after a U.S. prototype intermediate-range ballistic missile test in December 2019, a Chinese Ministry of Foreign Affairs spokesperson said the United States was trying to “free itself to develop advanced missiles and seek unilateral military advantage.”¹⁹⁵ Generally, the end of the treaty represented a sharply negative development in the eyes of Chinese officials and strategists. While China was able to advance its own ground-based missile capabilities without constraint over the treaty’s thirty-two years, the treaty’s end meant the evaporation of the assurance that Beijing would have to concern

itself solely with air- and sea-launched U.S. long-range conventional strike platforms in the Indo-Pacific and the possible conclusion of China's monopoly on ground-based land-attack intermediate-range missiles in East Asia. Indeed, the potential arrival of ground-launched U.S. missiles in Asia will add complexity to the PLA's military planning and targeting. Official Chinese statements in the aftermath of the treaty's demise warned U.S. allies against hosting possible new U.S. missile capabilities; a Chinese Ministry of Defense spokesperson said that "if the U.S. forces its way through, it would severely sabotage regional countries' security interests and harm peace and stability."¹⁹⁶

THE UNITED STATES' POST-INF TREATY PLANS

The end of the INF Treaty immediately led the United States to initiate various research and development programs for new missile systems. It quickly moved in 2019, after its withdrawal from the treaty took effect, to carry out two significant missile demonstrations. The first, mentioned at the outset of this chapter, involved a GLCM fired from a land-based variant of the shipborne Mark 41 Vertical Launch System used for Tomahawk cruise and other missiles. A second test, in December 2019, showcased a ground-launched intermediate-range ballistic missile, which "terminated in the open ocean after more than 500 kilometers of flight," according to the U.S. Department of Defense. Both tests were rapidly conceived and carried out by the department's Strategic Capabilities Office. The office has remained involved with U.S. post-INF Treaty missile development efforts, including with the U.S. Marine Corps' efforts to field a "ground-based, long-range, land attack cruise missile capability for employment by its rocket artillery units."¹⁹⁷

Since these demonstrations, practical U.S. plans for the deployment of new conventionally armed, ground-launched land-attack missiles in the post-INF Treaty Indo-Pacific remain limited. By the end of 2019, as many as six new missile programs, with varying levels of funding, took shape to potentially lead to deployable ground-launched missiles that previously would have been prohibited by the INF Treaty. These efforts were largely led by the U.S. Army. Starting with the 2018 *National Defense Strategy* and its Multi-Domain Operations concept,¹⁹⁸ the army began to emphasize long-range precision fires as an essential capability for future warfighting against near-peer adversaries. However, some of these programs have seen their funding zeroed out or have otherwise been mothballed in favor of concentrating resources into other programs. For instance, the army terminated research and development efforts for a 1,500-kilometer-range Strategic Long-Range Cannon in 2022, citing redundancy with other planned capabilities.¹⁹⁹ A month after the Trump administration first stated its intention to withdraw from the INF Treaty, the army's fiscal year 2020 budget request in February 2019 sought funding for a new "Mobile Medium Range Missile." The notional purpose of this missile was to seek a "lower cost strategic capability that can attack specific threat vulnerabilities in order to penetrate, disintegrate, and exploit in the strategic and deep maneuver areas."²⁰⁰ Funding for this system was zeroed out

in the army's fiscal year 2021 budget request, citing a "realignment of funds to higher priority programs."²⁰¹ Finally, in late 2019, reports suggested that the United States would seek to develop a ground-launched, intermediate-range ballistic missile with a 3,000-to-4,000-kilometer range,²⁰² but no such system currently is under development.

More recently, U.S. Army plans have broadly coalesced around three missile systems, each with differing qualitative and range-coverage characteristics. These new ground-launched capabilities are a direct result of the expiration of INF Treaty constraints, against the background of the increased and substantial utility of accurate ballistic and cruise missiles in conventional warfare and the resort to such systems by U.S. adversaries. The first of these, the PrSM, was under development as a treaty-compliant replacement for the 300-kilometer ATACMS. The PrSM has seen incremental range extensions from the prior, declared treaty-compliant range of 499 kilometers to around 1,000 kilometers.²⁰³ Among U.S. post-INF Treaty capabilities, the PrSM was the furthest along in development as of late 2022 and may be fielded by the army as soon as 2023. Existing M142 HIMARS integrated road-mobile launchers that can carry a single ATACMS missile will be able to carry two PrSM missiles. As of the end of 2022, the first generation of the PrSM had entered the engineering and manufacturing development phase; a second generation PrSM missile will reach early operational capability by the 2027 fiscal year.²⁰⁴ In August 2021, the U.S. Army and Australian Defence Force announced that Canberra would contribute \$70 million to the PrSM development program—particularly to support the development of the so-called Increment 2 PrSM, which aims to field an advanced seeker and guidance system to enable the targeting of ships and other mobile targets.²⁰⁵

A second army program, Dark Eagle (formerly Long-Range Hypersonic Weapon), is under development. Dark Eagle seeks to mate the joint U.S. Army–Navy Common Hypersonic Glide Body with a two-stage booster in the form of "all up rounds," or self-contained, integrated, canisterized firing containers. Dark Eagle launchers will feature transportable, towed erector-launcher systems, each equipped with two missiles. The U.S. Department of Defense's initial budget request described the primary role of Dark Eagle as providing the "Army with a prototype strategic attack weapon system to defeat anti-access/area denial (A2/AD) capabilities, suppress adversary Long Range Fires, and engage other high payoff/time sensitive targets."²⁰⁶ A prototype Dark Eagle battery was slated to be fielded by the end of the 2023 fiscal year but has since been delayed to the end of the calendar year.²⁰⁷ Following this, the capability will transition to a program of record.²⁰⁸ In December 2021, Christine Wormuth, the secretary of the army, stated that LRHWs "are much more likely to be fielded on United States territory," but that the army would be "ready, when called upon, to be able to put those kinds of capabilities in the [Indo-Pacific] region."²⁰⁹ Dark Eagle is the longest range of the imminently deployable U.S. post-INF Treaty ground-launched missile systems, with a stated range of "greater than 2,775 km," according to an army spokesperson.²¹⁰ Depending on the upper bound to the system's range, Dark Eagle may be able to strike targets within China and North Korea from Guam. For instance, many of the

mainland China-based PLARF brigades with Base 61 are within 3,000–3,200 kilometers of Guam. While Beijing is substantially further, Pyongyang—a plausible target for Dark Eagle—is some 3,400 kilometers from Guam. With an ambiguous upper-bound range, Dark Eagle is likely to leave U.S. adversaries concerned about the prospects of deep strikes without any need for basing on allied soil.

A third notable ground-launched system is the Typhon Missile System, which seeks to meet the U.S. Army’s Strategic Mid-Range Fires (formerly Mid-Range Capability) requirement, slotting in between the PrSM and Dark Eagle in terms of range coverage.²¹¹ Each Typhon launcher will be capable of launching multirole Standard Missile 6 (SM-6) surface-to-air missiles (240-kilometer range) and Tomahawk Block IV/V cruise missiles (2,500-kilometer range) combining anti-air, anti-missile, anti-ship, and land-attack capabilities. Typhon launchers will feature four reloadable Mark 41 Vertical Launch Systems, identical to those used on U.S. and allied warships to operate the SM-6 and Tomahawk, which may have accelerated the development of Typhon.²¹² Three types of support vehicles—a battery operations center, a reloader, and a battery operations center support vehicle—will additionally be associated with the Typhon launcher. The Typhon will deploy to at least two U.S. Army Multi-Domain Task Forces assigned to the Indo-Pacific region.²¹³ Following a June 2023 test of the system, the army announced that the system had reached full operational capability.²¹⁴

Of the three post-INF Treaty ground-launched systems meant to support the army’s long-range precision fire efforts, the Typhon is the only one with a Cold War analog in the form of the BGM-109G Gryphon GLCM; both systems featured towed, trailer-mounted launchers capable of firing four cruise missiles. Unlike the Gryphon, however, the Typhon’s missiles are not intended to carry nuclear warheads, and the Tomahawk’s long-range strike capability will be complemented by the short-range strike capability of the multirole SM-6 missile. One army official involved with the Typhon program noted that the system is capable of firing “many more missiles than a Tomahawk and an SM-6.”²¹⁵ As a result, the Typhon program “will be very much proliferated across our service, probably with our allied and partner nations, because it can shoot so many [types of] weapons,” the official noted.²¹⁶ The program’s flexibility also positions it to play a missile defense role. The SM-6, for instance, is capable of engaging terminal ballistic missiles at greater ranges than the Patriot Advanced Capability 3 Multi-Segment Enhancement and is undergoing testing against hypersonic threats.²¹⁷

Though the U.S. Army has the broadest array of new ground-launched missile capabilities, it is not alone (see table 1). The U.S. Navy has introduced a road-mobile ground launcher for short-range SM-6 missiles that features a containerized Mark 41 vertical launch system (conceptually similar to the Typhon); the system is known as the MK 70 Mod 1 Payload Delivery System.²¹⁸ The MK 70 Mod 1 may also deploy on U.S. Navy ships. One MK 70 launcher was seen on board an Independence-class littoral combat ship in 2023.²¹⁹ Another notable planned Tomahawk ground launcher is the U.S. Marine Corps’ uncrewed Long

Table 1. Select New U.S. Short-, Medium-, and Intermediate-Range Missile Programs (Post-2019)

Name	Service	Type	Basing	Range	Payload	Status	Notes
Precision Strike Missile (PrSM)	Army	Short-range ballistic missile	Road-mobile (M142 HIMARS and M270 MLRS)	400+ km	Conventional	Prototype and developmental testing (for newer increments)	Fielding anticipated in 2023. Future increments to feature range extension up to 1,000+ km, with the use of ramjets, and capability against moving land and maritime targets.
Dark Eagle (formerly Long-Range Hypersonic Weapon)	Army	Medium-range hypersonic glide vehicle	Mobile, towed erector launcher	2,775+ km	Conventional	Prototype testing	Fielding anticipated in 2023. Features unpowered Common Hypersonic Glide Body on a solid propellant rocket booster in the form of all up rounds.
Typhon Missile System (Strategic Mid-Range Fires)	Army	Multimode missile launcher (SM-6 and Tomahawk)	Towed Mark 41 vertical launch system	240–2,500+ km	Conventional	Initial operational capability	First prototype may be fielded by the end of 2023. Typhon can launch both SM-6 and Tomahawk cruise missiles from a common Mark 41 vertical launch system.
AGM-183 Air-Launched Rapid Response Weapon (ARRW)	Air Force	Hypersonic glide vehicle	Air-launched (B-1, B-52, and planned B-21)	1,000+ km	Conventional	Canceled	Canceled after three failed tests and one successful test.
Hypersonic Attack Cruise Missile (HACM)	Air Force	Hypersonic cruise missile	F-15E and likely B-52, B-1, and B-21	Unknown (likely sub-1,000 km)	Conventional	Development	The air force shifted focus to HACM following the cancellation of ARRW in 2023.
MK 70 Mod 1 Payload Delivery System	Navy	Short-range ballistic missile	Canisterized Mark 41 vertical launch system (land- or ship-based)	240+ km	Conventional	Development	May be capable of fielding Tomahawk cruise missiles.
Long Range Fires Launcher	Marine Corps	Ground-launched cruise missile	Remotely Operated Ground Unit Expeditionary (ROGUE) fires vehicle	2,500 km+	Conventional	Development	Features a single Mark 41 canister on an uncrewed, mobile launcher. May serve anti-ship and land-attack roles.

Source: *Naval News*, Congressional Research Service, *Air & Space Forces Magazine*, Arms Control Association, and The Drive.

Range Fires Launcher, which features a single canisterized Tomahawk missile per launcher. Like the NMESIS, the Long Range Fires Launcher uses a variant of the Remotely Operated Ground Unit Expeditionary (ROGUE) fires vehicle. The ROGUE system is designed to remain survivable through rapid mobility and, once deployed in substantial numbers, dispersal.²²⁰ With the army’s Typhon, the navy’s MK 70 Mod 1, and the marines’ Long Range Fires Launcher, the United States is expected to increase its overall production of Tomahawk cruise missiles in the coming years. Budget projections for fiscal year 2024 account for the procurement of 242 Tomahawk cruise missiles by fiscal year 2028.²²¹

While U.S. lawmakers have authorized substantial funding for a range of missile research and development efforts that would otherwise have been proscribed by the treaty,²²² questions persist about the military role of many of these systems and their basing in the Indo-Pacific. All of the earlier-discussed systems remain non-nuclear, and no U.S. plans to change that are known to exist. Given the primarily maritime geography of the Indo-Pacific as viewed from a U.S. vantage point, no assured deployment sites are available west of the second island chain. The U.S. territory of Guam—the closest at some 3,000 kilometers from China’s eastern coast—is likely to host the longest range of the publicly declared U.S. systems in development (the U.S. Army’s 2,775-kilometer LRHW), but other shorter-range systems have no concrete peacetime basing options, although regional allies might decide to host them in wartime or in a serious crisis.²²³

Other Conventional and Nuclear Capabilities

These new ground-launched capabilities are further supplemented by a qualitative and quantitative expansion to U.S. air- and sea-launched capabilities that were never treaty constrained in the Indo-Pacific and have long been a mainstay of U.S. power projection capabilities in the post–Cold War era. A wide array of such capabilities is currently deployed in the Indo-Pacific, and new planned systems will further buttress U.S. strike capabilities by the end of the decade. Ship-based Tomahawk land-attack cruise missiles and air-launched cruise missiles (particularly the 370-to-925-kilometer AGM-158 JASSM and its variants) confer a substantial deep-strike capability. Recent indicators further suggest that the U.S. Department of Defense is seeking to substantially increase production of JASSM/LRSAM (the 370-kilometer LRASM variant) missiles for the U.S. Air Force to as many as 1,100 per year.²²⁴ This could indicate a planned increase in the current maximum of 10,000 JASSM/LRASM units, which was itself an increase from an earlier maximum of 4,900 units that the air force had planned to procure.²²⁵ The U.S. Navy’s fiscal year 2024 budget request also indicates that production of new Tomahawk units will increase substantially, in part to support foreign sales.²²⁶

New capabilities, such as the AGM-183 Air-Launched Rapid Response Weapon (ARRW), were set to further supplement the ground-launched capabilities described earlier. The ARRW was a hypersonic air-to-surface, standoff weapon under development for the air force. The missile was expected to feature a maximum range of 1,600 kilometers with average glide speeds between Mach 6.5 and Mach 8.²²⁷ Despite a planned early operational capability date of September 2022, successive failed flight-tests delayed the program’s transition into production. A December 2022 success appeared to move the program closer to operational capability status,²²⁸ however, the U.S. Air Force ultimately announced the program’s cancellation in 2023.²²⁹ The air force is instead focusing on a hypersonic cruise missile program, known as the Hypersonic Attack Cruise Missile. This program remains in the development, test, and evaluation phase.²³⁰ The navy is additionally seeking to deploy a

Conventional Prompt Strike hypersonic missile—a version of the army’s 2,775+ kilometer LRHW equipped with the Common Hypersonic Glide Body—on Zumwalt-class destroyers and Virginia-class submarines by the mid-2020s.²³¹

Nuclear-capable nonstrategic missiles, meanwhile, have a diminished role for the United States in the Indo-Pacific and generally in the U.S. nuclear arsenal. U.S. theater-range nuclear capabilities have been limited since the end of the Cold War, particularly since the removal of U.S. deployed nonstrategic nuclear weapons in Asia pursuant to the U.S.-Soviet Presidential Nuclear Initiatives.²³² Post-Cold War adjustments to U.S. nuclear posture in the course of several *Nuclear Posture Reviews* have not reversed this trend; instead, some post-Cold War capabilities that remained in central storage, such as the nuclear-armed Tomahawk land-attack cruise missile, were retired.²³³

The primary set of long-range strike capabilities based in the region thus continues to be conventional. These are set to potentially diversify as new ground-launched systems are developed and deployed in the aftermath of the INF Treaty’s expiration in 2019.

While the Trump administration proposed a nuclear-armed sea-launched cruise missile in its 2018 *Nuclear Posture Review*,²³⁴ the Biden administration chose not to endorse this capability in its subsequent review.²³⁵ The sole deployed nonstrategic U.S. nuclear-capable missiles that would be available for prompt use in the Indo-Pacific as of 2023 include a limited number of deployed Trident D5 SLBMs with lower-yield W76-2 warheads. The Trump administration’s 2018 *Nuclear Posture Review* claimed this system would “help counter any mistaken perception of an exploitable ‘gap’ in US regional deterrence capabilities.”²³⁶ The Biden administration endorsed the W76-2 as contributing to the “flexibility” of U.S. deterrence strategy, including in the Indo-Pacific.²³⁷ Beyond the W76-2, U.S. nuclear-capable B-52H bombers can carry as many as twenty AGM-86B air-launched cruise missiles with variable-yield W80-1 nuclear warheads.²³⁸ B-2A Spirit bombers can further carry variable-yield B61 gravity bombs. No U.S. nuclear weapons are permanently forward-based at airfields in the Indo-Pacific. The primary set of long-range strike capabilities based in the region thus continues to be conventional. These are set to potentially diversify as new ground-launched systems are developed and deployed in the aftermath of the INF Treaty’s expiration in 2019.

The Role of New U.S. Capabilities

Despite surging interest in the pursuit of ground-launched systems with short, medium, and intermediate ranges, the military necessity or even benefits of these capabilities had been inconsistently appraised. For instance, in 2017, Selva said that the United States had

no military requirements that could not be satisfied “due to [U.S.] compliance with the INF Treaty.”²³⁹ Moreover, despite ongoing U.S. ambitions to hold at risk mobile targets—for instance, with successive planned increments of the PrSM—the army’s own examination of the advantages and drawbacks of long-range precision fires in its 2018 pamphlet on Multi-Domain Operations notes that these capabilities are “best suited for attacking stationary targets due to . . . long time of flight.”²⁴⁰ The same document notes that “naval strikes and stand-off air strikes . . . have characteristics similar to” long-range precision fires.²⁴¹ Moreover, U.S. officials have offered divergent views on the appropriate numbers for new hypersonic capabilities in the post—INF Treaty period. Secretary of the Air Force Frank Kendall offered the view that hypersonic weapons, due to their higher costs compared to ballistic or cruise missiles, will likely result in “relatively small inventories” for the United States.²⁴² During the Trump administration, by contrast, senior Pentagon research and development officials suggested that hypersonic weapons could be procured in much greater numbers, including in the “hundreds.”²⁴³

Much of the theory of how new U.S. missile capabilities—particularly, U.S. Army ground-launched missiles—will contribute to weakening Chinese A2/AD capabilities in a conflict depends on the specifics of regional basing. Some proponents of withdrawing from the INF Treaty, for instance, suggested that new U.S. missile capabilities could deny China’s conventional forces the ability to “quickly overrun America’s most vulnerable allies.”²⁴⁴ China’s substantial ground-based missile forces could inflict massive damage against U.S. allies and forward-deployed U.S. forces, but no new missile systems since developed by the United States could range the Chinese missiles’ launch points from currently available basing sites on U.S. territory. The U.S. Army notes, however, that its Multi-Domain Task Forces, which will be supported by new long-range missile capabilities, are designed to deliver “precision effects and precision fires . . . against adversary [A2/AD] networks in *all domains*, enabling forces to execute their operational plan (OPLAN)-directed roles” (emphasis added).²⁴⁵ This all-domain role suggests that targeting ground launchers for Chinese missiles may not be an initial priority—or that other mission sets (including anti-ship and anti-air/missile) may be a greater focus. In general, research and development efforts have proceeded apace with little specificity on basing. Senior U.S. Army officials acknowledge that basing depends on diplomatic and political factors. “The politics of where [new missiles are] based, how they’re based, will be up to the policymakers and the diplomats,” General James C. McConville, the chief of staff of the U.S. Army, said in March 2021.²⁴⁶ While these new missiles no doubt confer operational and tactical benefits that could contribute to the success of a future U.S. military campaign in the Indo-Pacific, the theory behind the utility of these capabilities must also contend with the political and strategic realities—and potential liabilities.

As the United States proceeds to develop and deploy these new missile capabilities, two particular issue areas will need further attention. First, as many of these capabilities qualitatively shift the nature of the non-nuclear threat to adversary nuclear forces (primarily in China but also in North Korea), new measures will be needed to mitigate the risk of

unintended escalation. China is in the process of expanding the size of its nuclear forces partly out of long-standing concerns about U.S. conventional counterforce capabilities, for instance. With little clarity on the nature of the targets that may be assigned to these various new strike capabilities, Chinese decisionmakers may see no reason to believe that the United States would eschew using these long-range non-nuclear strike capabilities as part of a broader counterforce campaign. This alone could partly motivate and justify China's ongoing nuclear stockpile expansion. Escalation concerns with North Korea, meanwhile, have rarely featured in U.S. debates on the post-INF Treaty missile force posture in the Indo-Pacific, but Pyongyang too is likely to bear similar concerns.²⁴⁷

A positive feature of the planned deployments of new ground-launched U.S. Army missiles is that they are all unlikely, initially, to have the capability to range deep within China, where they might otherwise hold nuclear weapons facilities, launchers, and other related infrastructure at risk.²⁴⁸ U.S. policymakers may seek to offer assurances to China along these lines while further underscoring that the United States would not otherwise seek to deliberately target nuclear forces with non-nuclear weapons. Though these sorts of assurances could be part of a strategic stability dialogue between the two countries, unilateral assurances can be valuable even in the absence of such a dialogue. These questions deserve particular urgency as the United States may move to devote greater value to non-nuclear weapons to cope more generally with China's growing nuclear forces. Jake Sullivan, Biden's national security adviser, has indicated that "cutting-edge non-nuclear capabilities," including "conventionally armed hypersonic missiles that can reach heavily-defended, high-value targets," may contribute to strategic nuclear deterrence as the United States faces, for the first time, two nuclear peers: China and Russia. Similar assessments concerning non-nuclear weapons of longer ranges had been offered by U.S. officials in earlier U.S. debates on global prompt strike systems prior to the U.S. INF Treaty exit.²⁴⁹ Beijing and Moscow are likely to interpret Sullivan's remarks as suggestive of a potential overt future nuclear counterforce role for new U.S. regional missile systems. While this logic appears to be primarily geared at domestic opponents of the Biden administration who might otherwise favor a quantitative expansion in the size of the deployed U.S. nuclear force, greater reliance on non-nuclear systems will need to contend with the new missile dynamics at play today in Asia.²⁵⁰

A second matter for consideration is the potential role of arms control—or general risk reduction—in lowering the costs of peacetime military competition and the scope of a war, should deterrence fail. Unlike the background to NATO's dual-track decision in 1979, the current theory of building up new missile capabilities rests almost entirely on buttressing deterrence of a general, regional, conventional war in the Indo-Pacific. As discussed earlier, China's reaction to the United States' withdrawal from the INF Treaty and its subsequent pursuit of new capabilities suggests that Beijing perceives these developments as negative for its own security interests. While China may not be eager to enter a process of formal, verified arms control initially—especially as long as it maintains a quantitative edge in theater-range missile forces—U.S. policymakers should begin to consider various arms con-

trol approaches that could bear fruit. They should simultaneously begin to explore allied perceptions concerning the role of missile forces in the region and consult on the parameters of possible arms control and risk reduction arrangements that would benefit U.S. and allied interests. Specific recommendations to this end are included in the final chapter of this report.

U.S. GEOGRAPHIC CONSTRAINTS AND DIFFICULT ALLIANCE POLITICS

The conditions driving post-INF Treaty missile development efforts in the United States today are largely incomparable to the dynamics that were at play in Europe in the 1980s, where concerns over nuclear instability and extended deterrence were paramount. A striking difference between the two cases is the role of geography. Cold War dynamics between NATO and the Warsaw Pact were centered on the continental landmass of Europe, while contemporary competitive dynamics between the United States and China are destined to play out in the vast maritime domain of the Indo-Pacific. Another difference is the fundamental asymmetry between the ground-based theater missile forces of the United States and China in Asia. This asymmetry manifested in the thirty-two years that the INF Treaty constrained the United States, a period that also saw guidance technology advances that gave theater ballistic and cruise missiles viable and substantial conventional battlefield missions that did not exist in the 1980s and were not envisioned in the treaty. As a traditionally continental military power, China invested heavily in mobile, land-based, theater-range missile forces initially for nuclear delivery, but it came to rely heavily on them (especially ballistic missiles) for conventional warfighting. The United States, meanwhile, has little territory available to base theater-range, ground-launched missiles in the Indo-Pacific—Guam is a notable exception—and its allies remain hesitant to host these missiles. As a result, U.S. naval surface warfare assets, submarines, and long-range bombers have served as the primary platforms for conventional long-range strike missions in Asia using manned aircraft and land-attack cruise missiles (not ballistic missiles).

However, for proponents of locating U.S. ground-launched missiles, both in anti-ship and land-attack roles, in Asia, the geographic realities of the region are a justification for pursuing such systems. Proponents emphasize the putative benefits of ground-launched systems, underscoring the limited missile-carrying capability of many air- and sea-based platforms and the lack of an at-sea reload capability for U.S. ship-based vertical launch systems.²⁵¹ They further add that the vast distances involved in projecting power across the Pacific Ocean may mean that U.S. air- and sea-based platforms may be otherwise unfavorably postured as a serious crisis escalates into a conflict, while forward-based ground-launched systems would provide a prompt strike capability if based appropriately. While these arguments contend with some of the inherent trade-offs involved in the long-standing U.S. reliance on air- and sea-based long-range strike systems, it remains likely that, whatever the

military utility of ground-launched land-attack missiles, the United States will simply lack real estate on which to base these weapons in peacetime.

Of the five U.S. treaty allies in Asia—Australia, Japan, the Philippines, South Korea, and Thailand—none are likely candidates for deployments of land-attack systems. Experts, analysts, and certain political decisionmakers in Australia and Japan are most positively disposed to such deployments, but they recognize the domestic political obstacles involved and have thus not publicly indicated that deployments are likely.²⁵² As discussed earlier, both countries have instead chosen to undertake substantial investments in their own missile capabilities; these could be supplemented by U.S. capabilities. South Korea, which hosted U.S. tactical nuclear weapons until December 1991, has also shown no interest in hosting such missiles now. Seoul is particularly aware of Chinese sensitivities, recalling the harsh unofficial economic sanctions South Korea endured after the 2016 decision with the United States to deploy a Terminal High Altitude Area Defense missile defense system on its territory.²⁵³ Moreover, South Korean experts and officials see little to no role for new U.S. strike capabilities on the Korean Peninsula, emphasizing the country's own substantial missile capabilities.²⁵⁴ There is interest among some officials in the redeployment of U.S. tactical nuclear weapons to the peninsula, but Biden administration officials have ruled out that prospect.²⁵⁵ Finally, the Philippines and Thailand are unlikely hosts for new U.S. missiles.²⁵⁶ Bangkok has sought improved ties with Beijing, and although the Philippines' approach to the United States has varied substantially with changes in its government—with a particular nadir for ties with the United States under the six-year presidency of Rodrigo Duterte—Manila has shown no openness to hosting U.S. missiles.²⁵⁷

It remains possible that growing threat perceptions concerning China and possibly North Korea may prompt certain U.S. allies in Asia to reconsider the possibility of opening formal consultations with the United States on missile basing. Public

opinion—which, for instance, is commonly cited by Japanese officials and experts as a primary inhibitor of such basing on Japanese soil—has markedly changed on defense issues in the aftermath of Russia's invasion of Ukraine.²⁵⁸ Tokyo is seeking to increase defense spending to as much as 2 percent of GDP, a substantial departure from Japan's generally limited post-World War II defense spending.²⁵⁹ Even if permanent basing of long-range surface-attack missiles on Japanese soil will remain challenging, some U.S. proponents have raised the possibility that such capabilities could be deployed on a rotational basis to enhance immediate deterrence in a crisis.²⁶⁰ Rotational deployments in a crisis, however, would be highly visible and could generate escalatory incentives for an attacker to act prior to the

It remains possible that growing threat perceptions concerning China and possibly North Korea may prompt certain U.S. allies in Asia to reconsider the possibility of opening formal consultations with the United States on missile basing.

arrival and deployment of these capabilities in theater.²⁶¹ Rotational deployments may also concede one of the core benefits of forward-deployed ground-launched missiles over their air- and sea-launched counterparts: their responsiveness and promptness. Continual rotations could obviate this problem but would introduce logistical complexities and likely result in political costs comparable to permanent deployments.

RUSSIAN POST-INF TREATY PROPOSALS AND A RETURN TO RESTRAINT

From Asian vantage points, the INF Treaty may seem entirely like a relic of a bygone era, but the structural role once played by the treaty continues to bear relevance in Europe, particularly since Russia's 2022 invasion of Ukraine. In 2020, following the INF Treaty's end, Russian President Vladimir Putin had offered a missile deployment moratorium focused exclusively on Europe. Russia was prepared to "refrain from deploying in its European part the 9M729 missiles," a 2020 report from state news agency TASS noted, implying that the once-treaty-violating dual-capable missiles would be drawn back to Russian territory east of the Ural Mountains.²⁶² At that time, the United States had assessed that four 9M729 battalions, featuring some one hundred missiles, had been deployed, including at least one battalion in Russia's Eastern Military District.²⁶³ While the Russian overtures were not reciprocated initially, NATO offered Moscow assurances about its plans following the treaty's end. As the United States withdrew from the treaty in August 2019, NATO Secretary-General Jens Stoltenberg publicly reiterated earlier NATO statements that the transatlantic alliance had "no intention to deploy new land-based *nuclear* missiles in Europe" (emphasis added).²⁶⁴

Putin had also proposed "mutual verification measures" to address ongoing Russian and NATO concerns. These measures focused on verifying both that fixed Aegis Ashore ballistic missile defense facilities in Europe could not launch offensive cruise missiles and that the Russian 9M729 missile remained nondeployed west of the Urals. The Russian proposal, however, did not accept the premise that the 9M729 was indeed a treaty-violating missile. In 2019, prior to the end of the INF Treaty, Russia had exhibited a missile it claimed was the 9M729, alleging that the missile was fully in compliance with the treaty. According to U.S. intelligence assessments at the time, the exhibited missile did not correspond to the missile that the United States had assessed as having been tested to ranges in violation of the treaty.²⁶⁵ As a result of this discrepancy and broader mistrust between the two sides, the United States did not seriously reciprocate Russian interest in exploring these verification measures nor a post-INF Treaty missile moratorium until the crisis leading up to Russia's February 2022 invasion of Ukraine.

Prior to Russia's invasion, Washington approached Moscow in early 2022 with written proposals concerning the military balance in Europe. This included broader arms control—

related measures, including on missiles.²⁶⁶ At least one of these measures appeared to respond to Russia's overtures in 2019 concerning a post-INF Treaty missile moratorium.²⁶⁷ Washington's offer also contended with intra-NATO divergences on acceptable reciprocity measures; Poland, for instance, was more interested in inspecting Russian missile deployments in the Kaliningrad exclave.²⁶⁸ Nevertheless, in the weeks leading up to Russia's invasion of Ukraine, U.S. officials emphasized that they were "open to discussing" the "future of certain missile systems in Europe along the lines of the INF Treaty."²⁶⁹

The contours of what a new European security architecture might look like in the aftermath of Russia's war in Ukraine are impossible to predict and, in any case, outside the scope of this report. However, it is not implausible that, either as part of immediate postwar negotiations or subsequent security talks, Russia and NATO may once again revisit missile-related matters. It is unlikely that an agreement resembling the INF Treaty would emerge out of such a process, particularly given the vast discrepancy in conventional precision strike capabilities between Russia and NATO that will likely be a lasting consequence of the former's large-scale missile use on the battlefield in Ukraine. Nevertheless, any new arrangements to limit the deployment of conventional missiles in Europe could have reverberations in the Indo-Pacific, either due to Russian insistence that novel missile capabilities under development by U.S. allies in Asia be considered or the effect this might have on allowing the United States to devote additional resources to buttressing its Indo-Pacific military posture. In other words, missile dynamics in the Indo-Pacific will likely be affected by future European security arrangements.

CHAPTER 4

MORE MISSILES, MORE PLAYERS, MORE ESCALATION RISKS

The most likely pathways to nuclear escalation in the Indo-Pacific, as elsewhere, begin with the outbreak of conventional war where one or multiple nuclear-armed states are implicated. In Asia today, any major conventional war—be it on the Korean Peninsula or in the Taiwan Strait—will implicate nuclear-armed states and/or beneficiaries of U.S. extended deterrence (Australia, Japan, and South Korea). However, as described earlier, conventional and dual-capable missiles can be expected to play a prominent role early in such a conflict. While deliberate resort to nuclear first use remains a risk—particularly with North Korea—unintentional pathways to nuclear escalation stemming from the use of non-nuclear or dual-capable missiles are a prominent, yet underappreciated, risk in the region.

The core risk stems from the possibility that intense conventional military operations—particularly those involving the large-scale use of missiles against a range of military and national leadership targets—could be perceived by a nuclear-armed state as targeting its nuclear operations or capabilities even when the intention behind such an operation was more limited in scope. This risk is particularly acute given the growing emphasis by regional militaries on holding at risk nuclear force assets with conventional weapons. The growing pursuit of conventional counterforce strategies presents serious escalation risks that continue to be largely discounted by planners and policymakers.

Unintentional escalation risks encompass inadvertent and accidental escalation. The latter may arise when missiles malfunction—particularly when tensions are high in a crisis. Inadvertent escalation concerns scenarios where the effects of military operations are greater in scope than intended—or are perceived to be so. While early scholarship on inadvertent

escalation focused on the idea that “intense conventional operations may *cause* nuclear escalation by threatening or destroying strategic nuclear forces,”²⁷⁰ prominent contemporary analyses in the post–Cold War era emphasize the possibility for escalation through other means, including the entanglement of conventional and nuclear command, control, communication, and intelligence systems.²⁷¹ Both sets of inadvertent escalation risks are prominent in the Indo-Pacific today. These risks could manifest without the use of missiles in war, but regional planners and policymakers should pay particular attention to missiles, due to many of the same characteristics that raise their appeal for regional states.

A NEW AGE OF CONVENTIONAL COUNTERFORCE?

In East Asia, the appeal of using precise conventional long-range strike systems to destroy or degrade adversaries’ nuclear capabilities—what might be termed conventional counterforce—has steadily risen in recent years. North Korea’s development of missile-mateable nuclear warheads and its increasingly sophisticated array of strike systems has primarily driven this trend. South Korea’s approach to coping with North Korea’s asymmetric nuclear capabilities emphasizes the use of conventional missiles to strike launchers, command and control systems, and other support infrastructure for Pyongyang’s nuclear forces. Similarly, the growing scope of North Korea’s capabilities has been frequently cited by Japanese proponents of longer-range missile capabilities; these proponents note that Japan should possess the capability to destroy North Korean launchers. North Korea’s advancing missile capabilities are a core justification for these capabilities in Tokyo’s updated 2022 *National Security Strategy* and *National Defense Strategy*. Seoul’s investments in enabling capabilities and missiles over decades leave it as the most capable pursuer of conventional counterforce strategies in the region today, but Japan is expected to devote substantial resources through the 2020s and into the 2030s to attain similar capabilities. Many of these capabilities would be adaptable for use against targets in China—particularly as the ranges of missile capabilities in both countries may increase over time. Japan’s 2022 National Defense Strategy underscores that counterstrike capabilities are “key to deterring invasion against Japan,” a threat that Tokyo does not perceive from North Korea but does to a much greater extent from China (especially in the East China Sea).²⁷²

Beyond military rationales for these capabilities, political factors are salient as well. In the absence of any diplomatic measures to restrain Pyongyang, for instance, leaders in both Japan and South Korea have sought to communicate to their respective publics that their militaries are planning and posturing to manage the consequences of any war with North Korea. In South Korea, in particular, the return of a conservative government in 2022 under Yoon, paired with poor diplomatic prospects, has resulted in a concerted and repeated emphasis on Seoul’s conventional counterforce options in the form of the Kill Chain and KMPR strategies.²⁷³ The Yoon administration has also demonstrated greater risk acceptance more generally. For instance, it responded to a violation of South Korean airspace by

North Korean drones in December 2022 by sending drones into North Korean airspace—a response that was deemed a violation of the 1953 Korean War armistice by the United Nations Command.²⁷⁴ Yoon criticized the South Korean military's failure to interdict the North Korean drones and blamed his predecessor's policies for the incident.²⁷⁵

Plans for the strict conventional counterforce of nuclear weapons have not generally been a prominent feature of military planning through much of the nuclear age. There have been two prominent instances of practical planning and high-level political consideration of the use of non-nuclear weapons against nuclear-armed systems: the Cuban Missile Crisis, when certain advisers to U.S. president John F. Kennedy promoted the idea of a surprise aerial bombardment campaign against Soviet nuclear-capable missiles in Cuba, and inquiries by U.S. president Obama about the feasibility of comprehensively destroying North Korean nuclear targets with the exclusive use of non-nuclear U.S. capabilities.²⁷⁶ In both examples, despite the availability of vastly different strike platforms and enabling technologies, U.S. political decisionmakers opted against conventional counterforce plans, which they saw as being too risky. Other instances of such planning took place during the Cold War—notably, against China's nascent nuclear force in the mid-1960s—but decisionmakers did not rule out the potential use of nuclear weapons.²⁷⁷ Similarly, while NATO and the Warsaw Pact each planned to hold at risk the other's forward-deployed nuclear assets in Europe with conventional weapons during the Cold War, both sides attached importance to their regional nuclear systems for this task as well.²⁷⁸ Similarly, U.S. Navy anti-submarine warfare planning efforts against Soviet strategic ballistic missile submarines during the Cold War did not exclusively rely on conventional armaments.²⁷⁹

Political leaders contemplating a conventional counterforce strike—especially to preempt an adversary attack—will seek high assurances that military plans against another state's nuclear forces will be highly likely to succeed in destroying all targets that could contribute to a massively damaging nuclear attack. Failing this, they will seek high assurances that whatever proportion of targets could not be destroyed could be addressed by active defenses, such as missile defenses, and that further damage could be mitigated by passive defenses, including civil defense. (The availability of missile defenses could lead decisionmakers to tolerate a lower probability of success for an initial strike, under the assumption that residual inbound missiles could be managed by such defense systems.) A final factor deserving of consideration is that the probability of successful preemption of nuclear forces would likely significantly decline in a conventional war already underway, when nuclear warheads and mobile launchers would be generated and dispersed.

Risks and Obstacles to Effective Conventional Counterforce

While many Japanese and South Korean defense planners privately recognize the limitations of conventional counterforce plans in blunting the totality—or even just a substantial part—of North Korea's forces, they nevertheless point to the damage-limiting benefits of

any counterforce strategy. Furthermore, South Korea, in particular, has long seen promise in threatening to hold at risk the North Korean leadership—specifically, Kim Jong Un, who is the sole known release authority for nuclear weapons in the country. Since the Park administration (2013–2017), Seoul has made explicit its intentions to kill Kim in retaliation for any North Korean nuclear attack. These intentions, however, coexist with Seoul’s separate-but-related plans to preempt North Korean missile launches (the Kill Chain strategy). Disambiguating the two strategies and assuring Kim that *preemptive decapitation* would not be part of South Korea’s warfighting approach has not been a prominent focus of Seoul’s messaging efforts. As a result, North Korea has behaved in ways that strongly imply that it perceives a preemptive decapitation strike as a primary threat to be deterred. For instance, to deter this perceived threat, North Korea updated its nuclear doctrine in September 2022 to explicitly threaten the “automatic and immediate” release of any and all nuclear weapons that would be available to the country’s military should Kim be killed or should its nuclear command and control systems otherwise be degraded (presumably through conventional operations, but possibly through U.S. nuclear strikes). While Kim’s implementation of such a dead-hand arrangement in practice will likely depend on advances in North Korean nuclear command and control systems, this step underscores the severity with which Pyongyang views Seoul’s leadership targeting plans.

For Seoul and Tokyo, apart from targeting North Korea’s nuclear command and control, which will remain tempting as long as the country does not move toward the delegation or pre-delegation of nuclear use authority, plans largely focus on employing precision strike systems against Pyongyang’s missile launchers. This approach borrows from post–Cold War doctrinal preferences in the United States, where the advent of precision-guided munitions and wars against technologically inferior adversaries prompted a greater interest in shooting the archer, metaphorically speaking.²⁸⁰ The canonical case is that of the so-called Scud hunt in the 1991 Gulf War, when U.S. forces sought to find, fix, and finish Iraq’s Al-Hussein Scud-B-variant short-range ballistic missiles.²⁸¹ Partly due to intelligence limitations and partly due to active and passive deception efforts by Iraqi forces, U.S. and coalition forces faced substantial difficulties in completing real-time assessments of Iraq’s mobile Al-Hussein missiles. Fixed targets and supporting infrastructure for missile launchers were less of a problem, but Iraqi mobile missiles remained exceptionally survivable and were able to successfully carry out launches. The coalition eventually adopted high-intensity aerial sorties of F-15E and F-16L fighters over kill boxes—predefined geographic areas where mobile missile units were expected to be operating—but still failed to blunt Iraqi launches.²⁸²

Intelligence, surveillance, and reconnaissance platforms and technologies have since improved—and substantially so. For instance, Israeli military intelligence was considerably more successful in cuing Israeli Air Force assets against mobile missile launchers in the 2006 Israel-Hezbollah War.²⁸³ Paired with initial preemption against known munitions storage sites, the Israeli Air Force succeeded in destroying “most” 202-millimeter and 302-millimeter rocket artillery systems available to Hezbollah.²⁸⁴ Despite these general technology

improvements, the scope of North Korea's missile capabilities is far greater, in both qualitative and quantitative terms, than that of Iraq's missile forces in 1991 or Hezbollah's in 2006. (And North Korea's terrain and hundreds of underground facilities countrywide are much more amenable to concealing missile units than the deserts of Iraq, for example.) Moreover, the costs of failure to coalition forces in the first Gulf War were limited due to the imprecise, conventional nature of the Al-Hussein missiles, whereas nuclear-capable North Korean missiles would inflict massive amounts of damage against military and civilian targets in a war, demanding greater prudence in military planning.

Partly in recognition of this challenge, South Korea has invested considerable analytical efforts to improve so-called counterbattery targeting—even before North Korea's nuclear-capable missile forces began to grow. Seoul has invested in new counterbattery radars and sensors to allow it to find, fix, and finish North Korean artillery and missile launchers, but only *after* they have fired and revealed their locations.²⁸⁵ Because Seoul has long faced a substantial threat from North Korean artillery systems, its investments and expertise in counterbattery planning are long-standing. Seoul has broader plans to adopt space-based optical sensors to aid in the tracking of North Korean military forces, but even these systems will be limited in their ability to abet the targeting of mobile missiles.²⁸⁶ Japan, meanwhile, is less experienced in this area and has faced apparent difficulties in properly tracking and characterizing the trajectories of certain North Korean missile launches.²⁸⁷ While Japanese and South Korean defense officials and military planners largely understand the difficulties of targeting mobile missiles, which can launch from nonpredetermined sites (sometimes termed launch pads), some civilian leaders and politicians in both countries appear to believe that North Korea relies on fixed, known launch sites. Such a belief may have had a role in the development and sustainment of these plans, which have received high-level political sanction in both countries.

Whatever efforts Seoul and Tokyo make to address the substantial demands of conventional counterforce targeting, it appears increasingly likely that the rate of qualitative refinement and quantitative growth in North Korea's missile arsenal will allow it to remain several steps ahead of its regional adversaries. With its pursuit of more responsive solid-propellant missiles, off-road-capable transporter erector launchers, an ever-expansive network of underground facilities and missile drive-through shelters, and extensive use of camouflage and concealment, targeting North Korean mobile missiles will remain highly challenging and the task of comprehensive counterforce intractable. In other words, there is likely no feasible conventional strike option that, if enacted, could be certain to spare Japan and South Korea nuclear retaliation by North Korea. Even if North Korean ballistic missile operating

In other words, there is likely no feasible conventional strike option that, if enacted, could be certain to spare Japan and South Korea nuclear retaliation by North Korea.

areas were well-understood, and if fixed facilities associated with the maintenance of missile bases were known—two open questions given Pyongyang’s penchant for secrecy—the levels of confidence required to assure that most or all of North Korea’s nuclear-capable systems would be destroyed will likely prove unattainable. The United States and its allies would likely face the greatest odds of success in a bolt-from-the-blue strike, but in any sufficiently advanced crisis that may transgress into a full-scale war, North Korea would likely have raised alert levels and dispersed its launchers.

Given these expectations, military planners and political decisionmakers in Japan and South Korea should seek to better understand the scope of what their conventional counterforce strategies could achieve in practice and the consequences of failure. They should also study the pathways to unintentional escalation that will remain with conventional counterforce planning. The earlier-described challenge to successfully executing a conventional counterforce campaign against North Korea underscores the most likely path to large-scale nuclear use, that is, if the combined forces of the United States and its allies were unable to destroy all possible vectors of North Korean nuclear employment in a war with conventional means. Another pathway to nuclear escalation concerns Pyongyang’s own doctrinal preference for both nuclear and conventional preemption. Even as North Korea’s nuclear and missile forces grow large and sophisticated enough to be effectively invulnerable to a conventional “splendid first strike,” Pyongyang will continue to perceive a high premium on shooting first if it assesses that a major crisis may have the potential to lead to significant military action by the United States and its allies.

Though North Korea is not the first nuclear-armed state in a competitive dyad to seek nuclear weapons out of a recognition of its own conventional military weaknesses, Pyongyang’s contemporary conventional limitations compared to its adversaries are especially severe. North Korean infantry, mechanized forces, air forces, naval forces, and air defenses rely largely on obsolete technologies and platforms and, due to resource shortages, would face serious difficulties sustaining high-intensity warfare for more than a few weeks. In a 2021 public assessment of North Korea’s military capabilities, the U.S. Defense Intelligence Agency identified “logistics for sustained combat operations” as a key vulnerability facing the country’s armed forces.²⁸⁸ As a result, North Korea is explicit about its intentions to use nuclear weapons to “repel” the conventional military forces of Japan, South Korea, and the United States. By doing so, Pyongyang hopes to degrade the willingness and ability of the allies to carry out conventional military operations under favorable conditions. Certain capabilities, such as F-35A stealth fighters, are of particular concern to Pyongyang,²⁸⁹ given the near-total inability of its air defense radars to detect and engage such a system. North Korean state media accounts of U.S.–South Korea military activities have expressed the view that F-35A fighters could be used “in a bid to mount a ‘preemptive attack’ on [North Korea].”²⁹⁰ These capabilities would be high priorities for North Korean preemption. North Korea would also seek to target South Korea’s mobile missile units, whose peacetime basing areas are generally known, and related command and control facilities early in a war to

prevent their use against its launchers. The presence of strong preemptive incentives in both countries is deeply destabilizing and reflects that they both have largely succumbed to what Thomas Schelling once described as the “reciprocal fear of surprise attack.”²⁹¹ Even without overtly planning for preemption of imminent attacks, merely possessing the capabilities, as Japan plans to do pursuant to its updated National Security Strategy, will carry destabilizing risks, potentially prompting a North Korean nuclear attack when either no attack or a conventional attack had been originally planned. For Japan and South Korea, some of these risks could be mitigated through the adoption of an exceptionally high intelligence standard for assessing that an attack is imminent.

Risks in a U.S.-China Conflict

While the risks stemming from conventional counterforce planning around North Korea are substantial, a potentially much greater medium-term risk in the Indo-Pacific pertains to possible nuclear escalation with China. In 2019, the U.S. Department of Defense’s annual report to lawmakers on Chinese military capabilities acknowledged, for the first time, that “adversary attacks against Chinese conventional missile forces-associated [command and control] centers could inadvertently degrade Chinese nuclear [command and control] and generate nuclear use-or-lose pressures.”²⁹² While the adversary went unnamed in the report, it was likely at the time that this referred to the United States. Increasingly, however, U.S. treaty allies—and even Taiwan—will be able to deliver equivalent effects using their own independently fielded and operated long-range strike capabilities. In a high-intensity conventional conflict in East Asia, it is likely that the United States would be implicated alongside its allies. An unaddressed and underappreciated escalation risk here concerns possible inadvertent strikes on Chinese nuclear-related command and control or other facilities by a U.S. ally that Beijing interprets as having originated from a U.S. launcher or platform. While China may not reasonably fear that Australia or Japan would attempt a conventional counterforce attack on its nuclear forces, it may fear such an attack by the United States. This has been a long-standing concern for Chinese officials and experts. Allied targeting could aim to hold at risk a wide array of Chinese capabilities, including Beijing’s theater-range, dual-capable missile systems and associated infrastructure. Allies could further aim to hold these capabilities at risk, either with the intention of limiting damage amid fears that China could resort to nuclear first use or simply blunting Beijing’s conventional strike capabilities.

Just as the United States has traditionally disfavored nuclear proliferation by its allies partly out of its interest in being the sole decider of when the nuclear threshold might be deliberately crossed, so too does it today have an interest—publicly unacknowledged so far—in ensuring that its allies do not inadvertently contribute to crisis escalation dynamics. To be sure, planners in the United States have readily imagined that allied strike and other capabilities could contribute, in a coordinated manner, to a dedicated offensive campaign. The

2019 *Missile Defense Review*, for instance, notes explicitly that the United States will “seek to integrate U.S., allied, and partner capabilities for . . . attack operations capable of striking the entire range of infrastructure supporting adversary offensive missile operations.”²⁹³ The opposite—when an ally’s military operations inadvertently escalate beyond a threshold that the United States itself is not ready to cross—is less considered. Formally, the problem for the United States is one of allied entrapment. For some allies, escalatory action could be partly precipitated by fears of abandonment by the United States and thus deliberately pursued to catalyze and ensure U.S. involvement. For instance, North Korea’s development of ICBMs has raised the salience of decoupling in assessing the credibility of Washington’s extended deterrence reassurances to Seoul and Tokyo.²⁹⁴

Both Chinese and North Korean nuclear forces continue to grow in ways that, if other relevant factors remain unaltered, should give their respective leaderships greater reason to withstand use-or-lose pressures in a crisis—particularly against conventional attacks. But this logic may not hold in a crisis and can hardly be relied on to mitigate the risk of nuclear escalation, which may depend more on subjective leadership perceptions that are susceptible to cognitive biases, for example. Given deterrence objectives in both countries, these problems may not be solvable, but the prospect of managing their consequences in potential crises would benefit from new institutional processes within U.S.-allied states to fully consider the risks of deliberate conventional counterforce strategies and the implications of inadvertent targeting in wartime. They will also depend on frank and honest consultations with the United States. But the United States is unlikely to replace its allies’ capabilities with offerings of its own to seize control of escalation through long-range conventional strikes. Allies’ investments in strike capabilities, as described previously in this report, are partly a means of enhancing self-reliance and potentially even hedging against longer-term concerns about the political reliability of the United States as an ally.²⁹⁵

THE RISKS OF ACCIDENTAL ESCALATION

No weapon system, past or present, exhibits perfect reliability. The same goes for missiles of all types. Accidents involving missiles can and do occur, either due to human error or technical malfunction, and this has been true throughout the missile age. The possibility of accidents involving missiles presents an important pathway toward escalation, including possible nuclear escalation, stemming largely from the proliferation of non-nuclear missiles and non-surface-attack missiles, such as air defense missiles. These concerns are far from theoretical. In 2022 alone, the world witnessed multiple instances of accidents involving missiles. In March 2022, an Indian BrahMos supersonic land-attack cruise missile was unintentionally launched into Pakistani territory, where it made impact without killing anyone. Due to relatively calm background conditions between the two countries, Pakistan did not interpret the event as an intentional attack but appeared to properly assess the event as an accident, demanding an explanation from India.²⁹⁶ New Delhi’s investigation later

determined that the incident was due to operator error and reprimanded Indian Air Force officers involved in the accidental launch.²⁹⁷ This event was the first of its kind between two territorially contiguous nuclear rivals. A similar incident took place in 2016 when a Taiwanese warship accidentally released a supersonic Hsiung Feng III anti-ship cruise missile westward toward China, striking a civilian fishing boat and killing its captain.²⁹⁸ Once again, due to a generally calm state of affairs between China and Taiwan at the time, the incident did not escalate, with China's Taiwan Affairs Office demanding a "responsible explanation" for the incident.

Accidents have also occurred under more tense background conditions. Two such cases took place in 2022, amid spiraling demonstrations of resolve between North Korea and South Korea. In October 2022, North Korea launched an intermediate-range ballistic missile over Japan and into the northern Pacific Ocean, the first time it carried out such a launch since September 2017. In response, South Korea and the United States carried out a joint missile exercise, each launching two ATACMS surface-to-surface missiles. In addition, South Korean forces launched one Hyunmoo-2 short-range ballistic missile, but this launch was not publicly announced like the ATACMS launches were. At around 11:30 p.m. on October 4, 2017, civilians near the South Korean city of Gangneung reported hearing a loud explosion and seeing a fire near the South Korean Air Force's 18th Fighter Wing Base.²⁹⁹ Social media footage of the event quickly went viral, with some people expressing concern that the event could have been the start of a North Korean attack. Tensions between the two countries had been simmering for weeks by the time of the incident, so that conclusion was not entirely unlikely. South Korean authorities later confirmed that a Hyunmoo-2 missile had been launched and had failed, resulting in the explosion.³⁰⁰ "Immediately after its launch," one anonymous South Korean military official noted to the press, "the missile flew inland instead of toward the sea and abnormally landed on a golf course on the base at a location approximately 700 meters from a civilian residential area."³⁰¹ Given the northerly launch site for this missile, a booster failure at a higher altitude could have resulted in the missile transgressing the inter-Korean Military Demarcation Line and striking North Korean territory. South Korean authorities also noted that the missile's warhead detached from the booster and did not explode; it is unclear if the lack of a detonation was due to the status of the missile's safing, arming, fuzing, and firing system or due to chance.³⁰²

Weeks later, North Korea carried out an unprecedentedly intense spate of missile launches, responding to aerial exercises by the United States and South Korea and launching more than twenty missiles, the most it ever launched in a single day.³⁰³ One missile landed 57 kilometers off the South Korean coast, an unprecedentedly southeasterly splashdown point for any North Korean missile launch. While South Korean officials initially described the event as "intolerable" and perceived it to be an intentional provocation by North Korea,³⁰⁴ recovery of the missile's debris through a salvage mission revealed it to be an old, Soviet-era SA-5 air defense missile that had been launched in surface-attack mode.³⁰⁵ SA-5 air defense missiles have prominently gone off course in other scenarios; in 2019, a Syrian-launched

SA-5 aimed at an Israeli fighter aircraft landed in Cyprus, for instance.³⁰⁶ A North Korean statement after the incident appeared to reject that it intentionally tried to strike that particular aimpoint in the Sea of Japan, underscoring that South Korea was “claiming” that North Korea had fired a missile near its territorial waters. (In that same statement, North Korea did claim that it intentionally launched cruise missiles 80 kilometers off of South Korea’s coast at an even more southeasterly aimpoint.³⁰⁷) The SA-5 was launched alongside a diverse array of North Korean missiles, including newer, solid-propellant missiles and older, Scud-variant missiles. It cannot be ruled out that the unprecedented impact off South Korea’s coast was due to a technical malfunction; under other circumstances, such a missile could have veered off course more substantially and landed on South Korean territory.

A final accidental missile event in 2022 took place in eastern Poland, along the Ukrainian border, in November. In response to Russia’s large-scale launches of cruise missiles, Ukraine fired an unknown number of air defense interceptors. One such interceptor—a Soviet-origin S-300—crossed into Polish territory and struck a village, killing two people. In the immediate aftermath of the event and before the event had been properly analyzed by NATO, an anonymous senior U.S. intelligence official told the Associated Press that “Russian missiles crossed into NATO member Poland.”³⁰⁸ This report, which was quickly disseminated worldwide due to the Associated Press’s wire services, prominently influenced perceptions, with analysts and even some officials from eastern NATO member states attributing the missile detonation in Poland to Russia and suggesting that it may have been deliberate. Senior Ukrainian officials, prior to NATO’s assessment that the missile as an errant interceptor, alleged that it was a “conspiracy theory” that the missile was an interceptor.³⁰⁹ The event did not lead to broader NATO-Russia escalation due to a conclusive assessment by the alliance that the missile was not of Russian origin. But the early public confusion underscored the dangerous possibility of escalation. Here again, background conditions played an important role: observers appeared motivated to interpret the limited available facts early on as a deliberate Russian attack due to the ongoing war and perceptions that Russia’s leadership might seek to deliberately probe NATO’s thresholds for escalation.³¹⁰ Prior to NATO reaching a conclusive assessment, Poland had intended to initiate Article IV consultations within NATO, which it later remanded, indicating that it did not view the event as a deliberate attack and saw no need to escalate.

These incidents—all from 2022 alone—underscore that the risk of unintended and accidental escalation stemming from the use, testing, and operation of missile forces is all too real. Because every missile will have an associated nonzero probability of failure in the course of ordinary use, the firing of missiles—for testing, demonstrative, or operational purposes—manifests some risk that the missiles will fail or otherwise behave in an undesired manner. While not all failures will lead to escalation, some types of failure are clearly riskier than others. The earlier examples all underscore, for instance, that background conditions are highly germane to how decisionmakers might interpret a given accident when only limited information is available. Pakistan was disinclined to view India’s accidental cruise

missile launch as a deliberate attack due to the relatively calm state of bilateral relations, while certain NATO states appeared motivated to portray the Ukrainian S-300 misfire as a deliberate Russian attack due to the extremely poor state of relations between Moscow and NATO during the Russia-Ukraine war. The inter-Korean examples, by contrast, underscore the possibility of missile-related accidents catalyzing escalation despite a shared interest by both sides in demonstrating resolve without upending the broader status quo. An errant South Korean Hyunmoo-2 landing on North Korean territory or an errant North Korean SA-5 landing on South Korean territory in a broader tit-for-tat spiral between the two sides could well spark broader escalation, particularly given the preemptive incentives for both countries described in this chapter. While wars might not emerge out of times of peace purely by accident,³¹¹ the prospects for accidents to stoke crises in escalatory ways should not be easily dismissed.

The frequent brandishing of missile capabilities in the Indo-Pacific—in peacetime and crisis, from the Korean Peninsula to the Taiwan Strait—underscores the importance for decisionmakers to understand accidental escalation risks. Other plausible accidental pathways to escalation include debris from non-notified North Korean missile tests striking civilian aircraft or ships, or missiles failing in overflight of another state’s territory. Even if such incidents are unlikely to precipitate a decision to massively retaliate, they could prompt limited retaliatory actions that could lead to broader escalation. The latter is particularly concerning as missiles’ overflights of populated areas are becoming more frequent in Asia. In August 2022, China, for the first time, launched multiple DF-15 ballistic missiles over Taiwanese territory—including over densely populated urban areas.³¹² North Korea has overflowed Japan’s Tsugaru Strait in an apparent bid to carry out long-range missile tests while minimizing its overflight of more populated Japanese regions in Honshu and Hokkaido. While in both cases, the ballistic trajectories of the involved missiles ensure that RVs are well outside of the earth’s atmosphere, an unintended in-flight failure could result in a range of accidental outcomes that could prove escalatory. Failures are particularly possible in developmental testing: at least one North Korean intermediate-range ballistic missile failed in flight after a significant period of boost-phase flight and crashed into a populated area on the country’s own soil.³¹³ While legal definitions concerning the altitudinal limits of sovereign airspace and space are gray, states generally find missile overflight of their national territory objectionable.³¹⁴ Notably, however, Taiwan appeared to underplay China’s missile overflight of its territory in August 2022 by underscoring that the missiles flew “beyond the atmosphere.”³¹⁵

Persistent hotlines, while not without their shortcomings, are a somewhat classic solution, but they have seen limited implementation in East Asia.

Fortunately, some solutions may help manage what otherwise might be highly escalatory accidents. Persistent hotlines, while not without their shortcomings, are a somewhat clas-

sic solution, but they have seen limited implementation in East Asia. Inter-Korean hotline communications, for instance, tend to thrive when relations are good between the two countries and are otherwise unattended by the North Korean side when tensions are high—precisely when a hotline would be most useful. (The hotline between United Nations Command and North Korea’s Korean People’s Army has proven somewhat more resilient.) A similar dynamic appears to be at play in the U.S.-China relationship; attempts by senior U.S. officials to use existing crisis communications as a high-altitude Chinese surveillance balloon intruded into U.S. airspace in February 2023 were met with silence.³¹⁶ In April 2023, China and Japan established a new hotline to manage incidents at air and sea, but the efficacy of that hotline remains untested.³¹⁷

Psychological factors may also complicate the practical utility of hotlines—particularly in fast-moving crises. The ability to quickly communicate with one’s adversary to explain the accidental nature of a missile launch event or other technical malfunctions may be essential in shaping what could otherwise be a highly uncertain information environment where decisionmakers could be primed to interpret benign accidents as the start of a highly threatening preemptive attack. However, decisionmakers could also be disinclined to take at face value any assurances delivered by an adversary through a hotline. Uncertainty about intentions can further prompt certain psychological biases, such as confirmation bias, to lead an adversary to conclude that an accident is, for instance, deliberate and thereby beget an escalatory response.

Beyond hotlines, missile tracking technologies may help avert escalation. A robust capacity to understand and assess missile events can help prime decisionmakers toward averting escalation. But technology is unlikely to be a panacea given that proper and complete event assessments can take hours, as demonstrated by the NATO-Russia example above, and escalation could take place on shorter timescales (particularly in cases where strong incentives to preempt exist, such as on the Korean Peninsula).

AMBIGUITY, SPEED, AND DECISIONMAKING UNDER PRESSURE

Many of the physical characteristics of missiles are likely to contribute to nuclear escalation risks in the Indo-Pacific. Speed is the most familiar of these; ballistic missiles, since the German V-2 in 1944, have provided a prompt strike capability outclassing crewed air platforms substantially. This remains true in Asia, where even legacy, Scud-derived North Korean missiles have flight times measured in minutes to targets in South Korea. Intermediate-range North Korean missiles, such as the Hwasong-12, once launched could reach the U.S. territory of Guam in just around twenty minutes. More advanced payloads, such as HGVs, can exhibit similar speeds but are often slower to target than equivalent-range ballistic missiles. What renders HGVs notable is thus not their speed—missiles have exhibited hypersonic speeds in their terminal phase for decades—but their endoatmospheric

maneuverability through much of the midcourse flight phase. For instance, while advanced postlaunch tracking of a ballistic missile may allow for a defender to reasonably extrapolate a possible target or a possible range of targets, doing so for longer-range HGVs may be less feasible. Cruise missiles present a similar set of challenges but are generally much more difficult to detect upon launch and track in flight than either HGVs or ballistic RVs.

With the exception of the United States, no regional state possesses a robust enough missile tracking and warning capability to maintain high-fidelity situational awareness about missile events *after* launches have been carried out. Russia's missile tracking and warning capabilities in its Far East region are likely second to the United States, but evidence suggests substantial gaps in Moscow's ability to accurately interpret missile events in the Pacific.³¹⁸ With Russian assistance, China started to develop a multimodal missile warning and tracking system in the latter half of the 2010s. Little is known about the fidelity of these capabilities, but the primary motivator of their development appears to be the goal of enabling a launch-on-warning posture for Chinese strategic forces.³¹⁹ As a result, China's terrestrial and space-based missile tracking capabilities may be especially calibrated to detect strategic missile attacks from the United States. Even the United States—which possesses a diverse array of land-, sea-, and space-based sensors, occasionally supported by deployed air-based sensors—has mischaracterized missile launches. In early 2022, for instance, a North Korean test launch of a MaRV-equipped ballistic missile prompted the U.S. Federal Aviation Administration to ground air traffic on the West Coast amid concerns that the missile may have been due for the continental United States.³²⁰ Though this error was quickly rectified, similar false positive signals in a crisis could prove escalatory, for instance, if they were misperceived as potentially targeting national leadership. Though the United States is pursuing new sensors to adapt to the proliferation of longer-range HGVs, sensor error or analytical error in crises could prompt an escalatory response when one is unnecessary.³²¹ The general lack of robust postlaunch trajectory, payload, and target characterization capabilities in the Indo-Pacific means that certain forms of ambiguity pertaining to missiles may be more pertinent *prior* to launch, as forces are being massed or otherwise prepared for use.

This points to a prominent source of inadvertent escalation risk concerning missile capabilities in East Asia today: the growing proliferation of dual-use nuclear-and-conventional-warhead-capable ground-launched missiles, primarily in China but also increasingly in North Korea. The primary danger stems from prelaunch warhead ambiguity, which could lead military planners to mischaracterize targets prior to an attack. An attack intended to destroy a given missile unit or launcher assessed as conventional that turns out to be deployed with a nuclear weapon could be misinterpreted by the target country as the start of a broader counterforce campaign.³²² As countries including Japan and South Korea posture their long-range strike capabilities to explicitly hold at risk North Korean missile launchers, their ability to properly characterize and discriminate nuclear-armed missile units from non-nuclear ones will have important implications for escalation management and control.

For instance, in a limited, conventional war, either Seoul or Tokyo may seek to carry out retaliatory conventional strikes on a specific North Korean unit that may have been implicated in a conventional missile launch against their territory. If the North Korean unit was operating a dual-capable system—possibly with nuclear warheads colocated nearby—

Regional military and policy establishments generally underrate the possibility that unintentional escalation pathways could have a bearing on crises and overrate their ability to control the full extent of escalation.

Pyongyang may have reason to interpret such a strike as the start of a broader disarming counterforce attempt and respond with massive nuclear use, even if its military planners would otherwise anticipate attacks intended to attrite its conventional forces. As North Korea moves toward the deployment of tactical nuclear weapons, this problem is likely to be further amplified as nuclear warheads may be stored and colocated with a greater number of missile units. Similar concerns exist with

the potential targeting of Chinese missiles systems, such as the DF-26, but most plausible scenarios where U.S. allies are carrying out deep strikes on Chinese soil likely involve a larger-scale regional conventional war where missiles may have been broadly used by both sides against a range of targets. China's adoption of dual-capable missiles may not be driven entirely by deliberate deterrence considerations but also by technical and bureaucratic factors.³²³ Similar factors may be at play in North Korean decisionmaking concerning dual-capable launchers. Neither country, however, may see reason to abandon this practice.

The full range of unintentional escalation pathways described earlier deserve serious consideration by regional military planners and political decisionmakers. Regional military and policy establishments generally underrate the possibility that unintentional escalation pathways could have a bearing on crises and overrate their ability to control the full extent of escalation. For Australia and Japan, both of whom are comparatively less experienced with the challenges of operating long-range strike systems, escalation concerns should be an integral part of developing new operational plans and procedures for the use of missiles in times of conflict. For the United States, it will be especially important to begin incorporating detailed, scenario-based discussions of escalation dynamics in policy and military consultative forums with Indo-Pacific allies. Washington and its partners may have divergent beliefs about the salience of specific escalation risks, which may remain undiscovered until a crisis presents itself. Addressing such divergences with frank and open exchanges during relative peacetime can ensure that military operations can proceed with the least amount of added risk should a conflict present itself.

CHAPTER 5

CHALLENGES TO RESTRAINT IN A MULTIPOLAR ENVIRONMENT

As missile capabilities proliferate rapidly in the Indo-Pacific, it is apparent that states remain disinclined to seek negotiated restraints or other forms of risk reduction. There is little evidence to suggest that national policymakers see a systemic, region-wide problem or that China or North Korea are interested in any risk reduction dialogues. As the previous chapters illustrate, the drivers of missile proliferation are multifaceted but primarily center around the increased contribution of land-attack missiles in conventional warfare and growing threat perceptions across the region. The proliferation of missiles is thus largely a symptom of broader regional security dilemmas today, even as the growth in missile arsenals deepens those dilemmas. Moreover,

there is a lack of even nominal restrictions on the theater missile forces of regional states, with the exception of North Korea, whose ballistic missile pursuits are specifically proscribed by UN Security Council resolutions, and Japan, whose missile ambitions must be compliant with its own constitutional restraints. As the North Korean case amply illustrates, the practical effect of Security Council resolutions in limiting the qualitative and quantitative growth of a state's missile capabilities has been modest at best. The end of both the INF Treaty and the U.S.-South Korea missile guidelines and a greater appetite in the United States for pursuing new forms of defense-industrial cooperation with its allies have broadly transformed

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the structural context for missile proliferation in Asia. Finally, the complexity of the contemporary Indo-Pacific's multipolar environment creates further obstacles for region-wide solutions.

MANAGING PROLIFERATION AND REDUCING RISKS

The demand-side drivers for missiles in Asia have been strong for years. Supply-side controls on missile proliferation, meanwhile, had been effective in slowing the growth of missile capabilities until about the 2010s, but they have become less effective as technology has advanced and diffused, indigenous missile production capabilities have expanded in North and South Korea, and Chinese and Russian technology have both remained relatively easy to obtain.

The MTCR, a multilateral export control regime, has seen some success in setting supplier state standards, but the regime's normative underpinnings—including the practice of exercising a “strong presumption of denial” on the transfers of complete missile systems—have frayed over the years. As great power rivalries have intensified, the MTCR's fortunes continue to trend in the wrong direction. For instance, some analysts cite the prospective transfer of U.S.-made Tomahawk land-attack cruise missiles to Australia pursuant to the AUKUS arrangement as further undermining the norm against the “uncontrolled proliferation of delivery systems.”³²⁴ While the MTCR's guidelines permit transfers of such systems on “rare occasions” and based on an assessment of the nonproliferation credentials of a potential recipient state—a standard under which both Japan and Australia fare well—the political nature of supplier state assessments to this end could erode the MTCR's intended purpose.³²⁵ Efforts to strengthen the MTCR can be useful in constraining the rate at which emerging state pursuers of missile technologies develop their arsenals,³²⁶ but the regime hardly provides a panacea for stemming the already serious and substantial risks surrounding existing and anticipated missile deployments in the Indo-Pacific. The growth of Chinese and North Korean missile capabilities, for instance, has been largely orthogonal to the supply-side constraints put in place by the MTCR.

The Hague Code of Conduct Against Ballistic Missile Proliferation (HCOC), established as a politically binding (but not legally binding) arrangement in 2002 by MTCR partner states, is another facet of the global normative architecture around missiles and missile technologies. Unlike the MTCR, which is limited in membership, the HCOC now has 143 subscribing states, making it the most broadly accepted normative arrangement around missiles globally. The HCOC's primary goals concern establishing norms against the proliferation of ballistic missiles and promoting general confidence building around ballistic missile and space-launch capabilities through transparency measures in peacetime practices. In particular, HCOC subscribers voluntarily “commit themselves politically to provide pre-launch notifications on ballistic missile and [SLV] launches and test flights.”³²⁷ While

the HCOC enjoys wide global support, many key states in the Indo-Pacific remain non-subscribers, including China, North Korea, Taiwan (which cannot subscribe), and several members of the Association of Southeast Asian Nations (ASEAN). (Australia, Japan, South Korea, and the United States are all subscribers.) As a result of this and other limitations,³²⁸ the HCOC has had little practical effect in constraining the proliferation of missiles in the Indo-Pacific. Its core confidence-building measure—the prelaunch notification system—has seen patchy compliance, including by established missile powers such as Russia and the United States. Proposals to improve, expand, and adapt the HCOC to contemporary realities could be useful,³²⁹ but it is unlikely that the regime will practically contribute to regional risk reduction in Asia in the coming years.

Other efforts to control missiles at multilateral and even global levels have not found success. One remarkable effort came in the late 2000s, when both Russia and the United States supported the idea of rendering global the INF Treaty’s bilateral ban on ground-launched missiles with ranges between 500 and 5,500 kilometers. In a 2007 joint statement on the sidelines of the sixty-second UN General Assembly, Moscow and Washington called on “all interested countries to discuss the possibility of imparting a global character to [the INF Treaty].”³³⁰ This effort ultimately saw little interest from other states, and neither country revisited the idea.³³¹ In 2008, a report by the UN secretary-general concluded that comprehensive, global controls on the proliferation and use of missile technologies “would probably be impossible.”³³² Since this observation, relations among the major powers have deteriorated substantially, and missiles have proliferated more widely—in Asia and elsewhere—and seen widespread use in conflicts by state and nonstate actors alike.

For the reasons described earlier in this report, policy interventions or regional diplomacy geared toward promoting a reversal or rapid cessation of missile proliferation in the Indo-Pacific—or globally—do not appear tractable in the short term. Instead, policymakers might seek to mitigate and limit the most negative potential consequences of missile proliferation, which include the possibility of rapidly proliferating missile capabilities contributing to heightened risks of nuclear war. Regional policymakers should understand that because large-scale conventional war is the most likely immediate antecedent to nuclear war and because missiles are likely to play an especially prominent role in any large-scale conventional war in Asia, measures of negotiated and unilateral re-

Regional policymakers should understand that because large-scale conventional war is the most likely immediate antecedent to nuclear war and because missiles are likely to play an especially prominent role in any large-scale conventional war in Asia, measures of negotiated and unilateral restraint around missile capabilities can substantially contribute to reducing nuclear risks.

straint around missile capabilities can substantially contribute to reducing nuclear risks. Though under very different geopolitical and structural conditions, this was essentially the insight that led to Cold War–era arrangements, such as the INF Treaty and the Mutual and Balanced Force Reductions (MBFR) talks,³³³ and eventually the Conventional Forces in Europe Treaty. In the context of the INF Treaty, nuclear-capable missiles were substantially more salient than conventional missiles, which have grown substantially in their precision and utility in the ensuing decades.

To be sure, contemporary geopolitics in Asia make readily apparent that the region is unlikely to find itself engaged in the sort of diplomacy that led to the INF Treaty or the MBFR talks. Asia today lacks the relatively neat bipolarity that existed in Europe late in the Cold War, where two collective defense treaty organizations—NATO and the Warsaw Pact, each comprising a nuclear superpower and otherwise large conventional military forces—sought to limit the risk and consequences of conventional and nuclear war through formal arms control. In Asia, the United States maintains its traditional hub-and-spokes network of alliances along with an unofficial and ambiguous commitment to Taiwan’s defense, while China, North Korea, and Russia are aligned to varying degrees. Moreover, the aforementioned late–Cold War processes took place in the aftermath of considerable U.S.-Soviet experience negotiating strategic arms control arrangements and other agreements beginning in the 1960s, including their monitoring and verification provisions. In Asia, the drawing board on arms control is nearly blank; North and South Korea have some limited and relatively recent experience in the form of their 2018 Comprehensive Military Agreement in limiting various types of military activities,³³⁴ but there are few other foundational building blocks for a formal regional arms control agreement that could contribute to the destruction of regional missile capabilities or otherwise impose quantitative caps on regional missile forces. North Korea offered up a unilateral moratorium on the testing of long-range missiles in April 2018, largely to build confidence and facilitate diplomacy with South Korea and the United States. However, that moratorium, which included both ICBMs and intermediate-range missiles, broke down in early 2022. Since 2019 and especially since launching an ambitious program of military modernization in 2021, North Korea has expressed no interest in negotiations with either South Korea or the United States. Moreover, a U.S.-China arms control process is nowhere in sight, despite repeated exhortations from Washington for Beijing to engage in noncommittal talks on strategic stability. Such a process may emerge on the other side of China’s ongoing quantitative nuclear force expansion, but missile-focused risk reduction cannot—and should not—wait for such a development. To the extent that China is engaged in verifiable arms control, it does so with neighboring states with which it has better political relations, such as Kazakhstan, Kyrgyzstan, Russia, and Tajikistan.³³⁵

NEAR-TERM RISK REDUCTION AND ORGANIZATIONAL CHANGE

Formal arms control in the vein of the INF Treaty and the Conventional Forces in Europe Treaty may one day emerge out of a shared sense of necessity in the Indo-Pacific, but for short-term risk reduction to succeed, the most effective interventions may concern unilateral changes to how regional states posture their forces, communicate their intentions, and plan to carry out conventional military operations. At the most fundamental level, policymakers and decisionmakers across the Indo-Pacific and in the United States must ensure that military- and policy-planning processes sufficiently account for the risk of unintentional escalation, both inadvertent and accidental, specifically relating to long-range strike capabilities. While some of this planning has begun in the United States,³³⁶ it remains wholly insufficient generally in the Indo-Pacific—particularly given many of the escalation pathways and risks described in the preceding chapter that may implicate the United States and its allies. Finally, given the rapid growth in the ability of U.S. treaty allies to deliver strategic and escalatory effects with their own autonomously controlled missile arsenals, alliance managers in the United States and their counterparts in the Indo-Pacific will need to incorporate escalation risks into their policies and plans moving ahead.

The policy apparatuses of many regional states and their military organizations will likely be hesitant to undertake unilateral changes out of concerns that these changes, even if they contribute to a lower risk of nuclear war, may otherwise compromise conventional deterrence and therefore create the opportunity for unwanted nuclear escalation. For the conventionally weak state of North Korea, for instance, manipulating the risk of uncontrolled nuclear escalation in peacetime and in crises will likely continue to be a core strategic imperative; as a result, Pyongyang is unlikely to see substantial incentives to engage in comprehensive risk reduction. Despite this, the United States and its regional allies should take the lead in adapting their own policies and military operational practices to ensure that unintentional escalatory pathways to nuclear war stemming from their current and future missile deployments are limited. The organizational and policy shifts that might manifest in risk reduction need not compromise either general deterrence, which will be highly dependent on the aggregate balance of capabilities and political factors, or immediate deterrence in a crisis, which will be contingent on signaling, posturing, and other forms of strategic communication. Above all, the United States and its allies have a shared interest in averting nuclear escalation in all plausible conventional war scenarios on the Korean Peninsula and the Taiwan Strait. This should be ample motivation to ensure that their policies, postures,

For short-term risk reduction to succeed, the most effective interventions may concern unilateral changes to how regional states posture their forces, communicate their intentions, and plan to carry out conventional military operations.

and military operational practices do not generate undesired escalation risks. On balance, unilateral organizational reform by regional states has the greatest potential to mitigate the risks of unintentional nuclear escalation stemming from the proliferation of missile capabilities in the Indo-Pacific.

A related means of risk reduction can emerge through new forms of coordination and consultation between the United States and its allies, including through trilateral and plurilateral formats. No two U.S. alliances in Asia are exactly the same, even if the threat perceptions underpinning allied planning and procedures may be shared. For instance, the U.S.–South Korea Combined Forces Command cannot be readily compared to the discrete command structures in the U.S.-Japan alliance. Moreover, the United States and

its allies may not exhibit similar levels of risk acceptance in crises. Because growing allied missile capabilities can contribute to unintended escalation in the Indo-Pacific, Washington should begin addressing inadvertent and accidental escalation risks in the context of its existing consultations with allies, including at the military-operational level. In the U.S.-Japan context, the bilateral Extended Deterrence Dialogue can serve as a useful forum to candidly raise these issues. In the U.S.-South Korea context, these topics can be

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included in exchanges such as the Korea-U.S. Integrated Defense Dialogue and the related Nuclear Consultative Group. The Nuclear Consultative Group, established pursuant to the April 2023 Washington Declaration, would be a particularly suitable venue—as would a potential trilateral U.S.–Japan–South Korea mechanism. With Australia, the bilateral Strategic Policy Dialogue would be a fitting forum for Washington to address these issues in an allied context. Across these dialogues, U.S. and allied officials should identify potentially divergent assessments of escalation risks and, where appropriate, pursue scenario-based approaches to intra-alliance dialogue. Tabletop exercises can play an important role in this endeavor. Taiwan, as a non-treaty ally with no formal military consultative dialogue mechanisms, presents a more complicated case, but Washington can seek to promote exchange through track 1.5 and track 2 dialogues on these and related matters. In 2022, over the course of the Russia-Ukraine war, U.S. decisionmakers demonstrated sensitivity to the escalatory risks of certain deep strike capabilities in the hands of a non-allied but friendly Ukraine. They should address similar risks with treaty allies and partners in Asia.

The next, most tractable pathway to meaningfully reducing missile-related escalation risks is two-party dialogue and confidence-building. The two most meaningful dyads here are U.S.-China and North Korea–South Korea (though a U.S.–North Korea process would

also be desirable). In the U.S.-China case, a dialogue on missile-related risks should be subsumed into a broader process on strategic stability. The United States has strongly advocated for such talks, but China has shown little reciprocal interest. As of late 2021, the prospect of U.S.-China talks on strategic issues remained in the “early stages,” according to a senior U.S. official.³³⁷ Through October 2023, there had been no evidence of progress between the two sides. Instead, Beijing suspended certain military dialogues in the aftermath of Pelosi’s August 2022 trip to Taiwan.³³⁸ The two Koreas, meanwhile, have seen no meaningful bilateral dialogue since 2019, and military tensions have particularly spiked since the arrival of a conservative administration in Seoul in May 2022. Since the second half of 2022, Seoul and Pyongyang have traded barbs and carried out reciprocal shows of force. The 2018 Comprehensive Military Agreement has shown little staying power. De-escalating the ongoing inter-Korean spiral may depend on the catalyzing effects of a serious crisis, but a crisis could just as easily spiral into a greater conflict. Given Pyongyang’s particular disinterest in dialogue around the premise of denuclearization of the Korean Peninsula,³³⁹ inter-Korean risk reduction may depend on a policy sea change in both Seoul and Washington.

REGIONAL DIALOGUE AND CONFIDENCE BUILDING

While unilateral organizational changes are both the most tractable and meaningful near-term path to risk reduction, states should not entirely overlook the possibility for meaningful progress on regional risk reduction efforts. The place to begin with regional processes on risk reduction will be with general, region-wide dialogues that are inclusive and diverse in representation.

The ASEAN-led East Asia Summit (EAS) may be a useful venue for regional governments to raise concerns about missile-related escalation risks. The EAS has traditionally avoided issues related to nuclear escalation since its inception in 2005, but that appears to be changing in the aftermath of Russia’s invasion of Ukraine. At the 2022 meeting of the EAS, then Chinese premier Li Keqiang underscored the “irresponsibility” of nuclear threats, in a possible indication of Beijing’s discomfort with the implicit and explicit threats to use nuclear weapons issued by various Russian officials, including Putin, in the course of the war.³⁴⁰ Similarly, shortly after North Korea carried out an unprecedentedly intense campaign of missile launches during military exercises, South Korean President Yoon used the 2022 EAS to emphasize that peace in the Indo-Pacific was premised on Korean denuclearization.³⁴¹

Other forums centered around ASEAN, including the ASEAN Defense Ministers Meeting–Plus and the ASEAN Regional Forum,³⁴² could make for useful consultative settings as well. The latter, for instance, has seen regular North Korean participation—a rare feature in regional security dialogues.³⁴³ Indeed, the salience of missile-related issues is rising for ASEAN states as proliferation trends have intensified in the region.³⁴⁴ While certain ASEAN states may be reluctant to discuss these issues openly, the Indo-Pacific currently lacks other

forums that could serve as logical starting points for region-wide consultations that could help identify shared interests.

Beyond ASEAN-centered forums, a more specialized regional forum—the Western Pacific Naval Symposium—could be a useful venue to discuss matters related specifically to ship- and submarine-based missile systems. The symposium, which includes Australia, China, Japan, South Korea, and the United States, could table transparency measures related to missile-related activities on naval platforms. Other specialized defense forums—notably, the annual International Institute for Strategic Studies’ Shangri-La Dialogue—could also raise the prominence of missile-related escalation risks in the region. Though the dialogue has not traditionally featured nuclear weapons matters prominently on its agenda, the 2022 iteration emphasized regional nuclear issues, with calls from Japanese Prime Minister Kishida for the United States and China to engage in nuclear arms control and several questions on the drivers of China’s nuclear and missile buildup to various regional defense ministers, including then Chinese defense minister Wei Fenghe.³⁴⁵ The 2023 iteration featured nuclear weapons issues more directly on the agenda.³⁴⁶ As the salience of nuclear matters rises in the Indo-Pacific, future Shangri-La Dialogues may address these issues regularly and directly, including in plenary sessions with regional defense ministers.

Short of arms control, institutionalized multilateral transparency and confidence building would be highly desirable. For instance, a shared recognition of risks stemming from missiles could prompt Indo-Pacific states to see value in a multilateral missile launch notification regime.³⁴⁷ Such a regime could take best practices from existing arrangements—for instance, the HCOC or those between the United States and Russia, Russia and China,³⁴⁸ and India and Pakistan³⁴⁹—and seek subscribers across the region.³⁵⁰

The least tractable—but most desirable—form of risk reduction around missiles in the Indo-Pacific would be a multilateral, verified arms control agreement. A ban on nuclear-armed GLCMs, for instance, is highly desirable. Eliminating an entire class of ground-launched missiles in Asia from a nuclear-delivery role would have a substantial effect on reducing escalation risks. China does not deploy any nuclear-armed cruise missiles. While North Korea has indicated that a new GLCM is a “strategic” weapon—that is, nuclear-capable, per Pyongyang’s traditional euphemism—it remains unclear whether Pyongyang has produced sufficiently compact nuclear warheads for such a system. The United States does not deploy any ground-launched, theater-range nuclear weapons and has no plans to. Because the Biden administration has scrapped plans to revive a nuclear-armed sea-launched cruise missile capability, the sole nuclear-capable cruise missiles in the U.S. arsenal today are air-launched: the AGM-86 air-launched cruise missile and, soon, the modernized AGM-181 Long-Range Standoff missile. Russia does deploy theater-range, nuclear-armed GLCMs, including in its Eastern Military District, and would present a challenge to such a multilateral agreement. A multilateral regional agreement could still proceed by requiring Russia, for instance, to base any nuclear-capable cruise missile launchers west of certain

longitudes. However, NATO allies would not be pleased, and Russia's history of cheating on the INF Treaty with this same missile does not bode well for compliance with such a restriction, which presumably would be overridden in wartime anyway. Physical verification would also pose a substantial challenge—particularly in terms of Chinese and North Korean acquiescence to the intrusive protocol necessary to verify, for instance, that declared cruise missiles were non-nuclear objects. Limits on GLCMs could be circumvented by concealing nuclear-armed missiles (or swappable nuclear warheads) and using the same missile as a nuclear air-launched cruise missile or sea-launched cruise missile. Nevertheless, insofar as long-term, moonshot regional missile-oriented arms control is concerned, such a process could have substantial value in mitigating nuclear risks. Once implemented, such an arrangement, if complied with, could substantially mitigate mistrust and ambiguity around regional GLCM capabilities and create the conditions for follow-on agreements covering ballistic and nonballistic maneuverable missiles, including hypersonic missiles.

SCOPING RISK REDUCTION: WHO SHOULD BE AT THE TABLE?

While the states examined closely in this report possess substantial missile capabilities today or will soon possess such capabilities, with implications for escalation in the Indo-Pacific, the capabilities of other regional powers including India and Russia bear on regional dynamics as well.

India's conventional and nuclear missile forces, while not a primary driver of Chinese threat perceptions and defense investments, are nevertheless a consideration for Beijing.³⁵¹ Notably, a 1996 China-India agreement on confidence building along their disputed land borders is somewhat unique among bilateral undertakings by China in that it provides for the nondeployment of “surface-to-surface missiles” within “mutually agreed geographical zones.”³⁵² While the agreement has come under substantial stress amid intense border clashes between the two countries in recent years³⁵³—especially beginning in 2020—it provides at least one case when Beijing willingly accepted a measure of restraint in a reciprocal manner. However, China remains reluctant to engage with India on new measures of military restraint. Furthermore, India remains mired in a competitive nuclear dyad with Pakistan, adding potentially yet another country that ought to be considered in the course of regional risk reduction efforts. Overall, India's direct military involvement in a large-scale conventional war in East Asia is unlikely and, while a China-India conventional war cannot be ruled out, limiting the scope of such a war will depend mostly on bilateral dynamics between Beijing and New Delhi. For these reasons, subregional confidence building and risk reduction efforts in southern Asia may hold greater promise for addressing India's role in the Indo-Pacific.³⁵⁴

Similarly, Russia's missile deployments and activities in its Eastern Military District are of special concern to Japan and the United States.³⁵⁵ Both Japan and South Korea have also

grown increasingly concerned about apparent China-Russia collusion in certain conventional military operations, such as intrusions into Seoul's air defense identification zone or presence operations near disputed islands administered by Tokyo in the East China Sea.³⁵⁶ The scope of possible China-Russia cooperation in the context of a conventional war in Asia remains uncertain and hotly debated as the two are not formal allies but have coordinated on military matters in new and unprecedented ways. Similar concerns may surface about potential Russian support for North Korea in a conflict, given rapid shifts in that bilateral relationship.³⁵⁷ The ongoing war in Ukraine has had a significant effect on Russia's stocks of long-range precision strike capabilities, but the plausibility of incorporating Moscow into any postwar multilateral risk reduction process in Asia will likely be highly contingent on a postwar settlement in Europe. For Washington, reengaging Moscow on strategic nuclear arms control will take precedence over promoting Russian engagement in a more limited regional risk reduction process. Though these processes need not be mutually exclusive, it will likely be politically challenging to incorporate Russia into an Asia-specific risk reduction process. Finally, though Russia will remain a relevant military actor in East Asia—particularly with its air and naval capabilities—the substantial degradation of its conventional military capabilities in the course of its campaign against Ukraine could suggest that missiles currently deployed in its Eastern Military District could be relocated westward, either for use or to augment perceived deterrence requirements against NATO. Given the uncertainties associated with Russian missile production in a postwar scenario, however, policymakers should not rule out the possibility of Moscow once again prioritizing a robust and potentially growing East Asian missile presence. Russia would also be able to internally relocate missiles and launchers eastward if needed.

A comprehensive approach to missile-related risk reduction would suggest that India and Russia ought to be at the table, even if this would further reduce the feasibility of arriving at multilateral measures. Increasingly, Myanmar,³⁵⁸ the Philippines, Thailand, and Vietnam ought to be engaged given their respective capabilities and regional roles. Vietnam has legacy Scud-type surface-to-surface missiles and may soon enter talks to potentially purchase the Indian-Russian supersonic BrahMos missile (a capability Hanoi has long coveted).³⁵⁹ Thailand and the Philippines are U.S. treaty allies, and the latter is expecting deliveries of three BrahMos supersonic anti-ship cruise missile batteries.³⁶⁰ Manila is unlikely to accede to the permanent basing of the U.S. precision strike systems that are under development, such as the Typhon or the PrSM,³⁶¹ but the U.S.-Philippines alliance is responding to changes in the regional missile threat environment; for example, during the bilateral U.S.-Philippine Balikatan exercises in 2022, the two countries deployed Patriot missile defenses for the first time.³⁶² These states should certainly engage in regional discussions on confidence building and risk reduction, including through the ASEAN-led forums mentioned earlier. Their incorporation into possible multilateral processes focused primarily on reducing nuclear escalation risks in East Asia—especially in the Taiwan Strait and Korean Peninsula—is less essential and would likely heighten the already high political and diplomatic thresholds to facilitating regional risk reduction.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

While policymakers and military planners across the Indo-Pacific acknowledge a worsening threat environment and intensifying geopolitical competition, they continue to underrate the consequences of missile proliferation in the region, particularly as far as escalation risks are concerned. As the previous section noted, Asia is far from adopting a comprehensive set of negotiated restraints that could apply to all countries pursuing large missile arsenals. The relatively neat and rough bipolar parity that existed between NATO and the Warsaw Pact in the Cold War, allowing for processes like the MBFR talks to play out and arrangements like the INF Treaty to emerge, are nowhere to be found in Asia. Further, as earlier chapters clarified, the drivers of missile proliferation vary from state to state—as do the types of capabilities being pursued and the various tactical and strategic concepts for their potential use in times of war.

Despite the undeniable complexity of multipolar competitive dynamics driving missile proliferation in Asia, all concerned states continue to share an interest in averting unwanted nuclear war, be it in the Taiwan Strait or on the Korean Peninsula. As a *de minimis* condition for promoting regional interest in risk reduction around proliferating missile capabilities, this shared interest should suffice, in theory, but has not in practice in Asia. In the case of Cold War competition in Europe, the MBFR process and its parallel political effort, the Conference on Security and Cooperation in Europe talks, manifested after initial U.S.-Soviet efforts at formal arms control and were borne of out a shared concern for the possibility of nuclear conflict and uncontrolled escalation. The former would go on to manifest in the Conventional Forces in Europe Treaty. More specifically, these ambitious regional

efforts built on agreements in the 1960s and early 1970s, most prominently the U.S.-Soviet Hotline Agreement (1963), the Limited Test Ban Treaty (1963), the Strategic Arms Limitation Talks Interim Agreement (1972), and the Anti-Ballistic Missile Treaty (1972) but also arrangements like the Incidents at Sea Agreement (1972) and the Prevention of Nuclear War Agreement (1973). An essential condition for the regional efforts that manifested during the *détente* era, thus, was the shared and acknowledged U.S.-Soviet understanding of the risks of nuclear war.

In East Asia today, this important subsidiary condition doesn't exist in the two primary dyadic nuclear deterrence relationships: the U.S.-China and U.S.–North Korea relationships. China remains reluctant to enter strategic stability talks with the United States. The United States, meanwhile, is unwilling to acknowledge a relationship of mutual vulnerability with China, an acknowledgement that could facilitate a move toward arms control.³⁶³ With regard to North Korea, the United States—along with its allies Japan and South Korea—continues to pursue a compelling objective of denuclearization despite the materialization of a credible North Korean nuclear force that becomes more sophisticated every year. Compared to its earlier consideration of denuclearization, Pyongyang has grown increasingly categorical in its rejection of any diplomacy premised on pursuing that goal.³⁶⁴ It is against these backdrops that regional missile dynamics have intensified, implicating not only the three states party to the two dyads but increasingly U.S. allies and partners. Reducing the risk of nuclear escalation and avoiding a large-scale conventional war will thus require policy interventions and organizational changes across multiple axes. The following recommendations target varied constituencies, but they all seek to realistically advance risk reduction while acknowledging that the structural shifts necessary to promote formal, multilateral arms control are unlikely to manifest in the short term.

WHAT THE UNITED STATES CAN DO

Maintain solely non-nuclear, theater-range, ground-launched missiles. Since the end of the INF Treaty in 2019, all new U.S. short-, medium-, and intermediate-range ground-launched missile systems are non-nuclear in nature. The 2022 *Nuclear Posture Review* does not endorse any new nuclear role for these systems. To prevent new sources of ambiguity that could prove destabilizing in a crisis and cause adversary misperception, the United States should, where possible, offer assurances that its long-term procurement plans do not include any new dual-capable, ground-launched missiles. The United States also should regularly, including in future strategic reviews, reaffirm its intention not to deploy dual-capable, ground-launched missiles to Asia. Such a policy would not preclude a future U.S. administration from reversing course and authorizing the development of a dual-capable variant or nuclear warhead for an existing missile or a new system entirely, should the security situation demand it.

Comprehensively assess its regional missile capabilities in the Indo-Pacific and escalation risks. As earlier sections detailed, many new U.S. regional conventional missile capabilities—particularly those programs initiated after the end of the INF Treaty—have been technologically and bureaucratically driven. Not only are questions concerning off-territory basing unaddressed by the military services that will eventually field these weapons, but also, no comprehensive strategic review of U.S. regional missile posture exists to include assessments of likely adversary responses. To address these deficiencies, the U.S. secretary of defense should promptly require a cross-departmental review of U.S. strike capabilities in the Indo-Pacific, incorporating currently fielded capabilities and capabilities that are expected to be fielded by 2030. Such a review should be centered within the Office of the Secretary of Defense and led by civilians reporting to the undersecretary of defense for policy. Country-specific and functional experts within the Office of the Secretary of Defense should support such an effort.

This review should comprehensively assess the full array of U.S. regional strike capabilities, covering all guided missile systems with ranges between 300 kilometers and 5,550 kilometers and their planned launch platforms. The review should culminate in an unclassified release, but an accompanying classified review should examine parameters relating to platform ambiguity, warhead ambiguity (for air-launched missiles that are dual capable), and time-to-target for various capabilities that may play a role in striking possible targets in China and North Korea. The review should further assess the unintentional escalation risks associated with new ground-launched missile capabilities. Finally, the review should examine potential acquisitions, existing and future munitions stockpiles for long-range strike capabilities, and research and development efforts for new strike capabilities.

Work to assess allied potential to escalate non-nuclear conflicts. Non-nuclear capabilities fielded by U.S. allies can contribute to the risk of nuclear escalation in new and diverse ways. While these concerns have episodically influenced U.S. alliance management in Asia, policymakers and lawmakers in the United States should increase their awareness of recent regional developments that contribute to escalation dynamics. A government-led study or review of these risks is likely to be politically and diplomatically sensitive. As a result, two vectors may be useful to improve awareness. First, the U.S. Department of Defense should establish an independent panel on alliance coordination and conflict escalation. This panel, comprising nongovernmental experts and former officials with country-specific knowledge pertaining to U.S. allies in the Indo-Pacific, should meet and produce a report on the scope for catalytic escalation in plausible regional crises led or initiated by an ally. A second vector to raise awareness is Congress, which should work to convene new hearings on these issues. The hearings, hosted by the appropriate House of Representatives and Senate subcommittees, need not focus explicitly or solely on escalation but could generally address the subject of novel allied capabilities and defense strategies.

Study the implications of missile deployments and arms control. The U.S. State Department's Bureau of Arms Control, Verification, and Compliance should commission a civilian-led expert group—with participation, *inter alia*, from regional officials in the department's Bureau of East Asian and Pacific Affairs as well as the Office of the Secretary of Defense—to study the implications of new U.S. capabilities and deployments in Asia on possible arms control with China and on diplomacy with North Korea. Both of these are goals for the United States, but the role of new missile capabilities remains underevaluated in terms of these issues. This group should evaluate whether approaches to North Korea independent of a denuclearization objective may be more conducive to promoting risk reduction around missile capabilities.

Exercise conditionality as a term of supply for long-range missile systems. The United States is likely to proceed with the provision of Tomahawk land-attack cruise missiles to both Australia and Japan. Because this system may contribute to inadvertent escalation as a result of allied action, Washington should privately seek to apply conditionality on the end use of this system in times of crisis. A primary condition should include the promotion of additional joint operational planning with the United States in all scenarios where either state may consider employing this capability. This conditionality need not be strictly formalized, given the potential negative consequences for each alliance, but at the very least the United States should further communicate that no Tomahawks supplied should be used against known facilities involved in nuclear operations and command and control without direct consultations. Potential future supply of long-range missiles to these two and other allies should similarly consider the strategic stability consequences of such supply. Washington should further be willing to condition possible technical support and assistance to indigenous long-range missile programs in Australia and Japan on these criteria. The spirit of this conditionality should not be to unduly constrain allies but to better align military planning and mitigate escalation risks. Moreover, existing U.S. law concerning arms exports already requires that decisions take into consideration whether the supply of a requested item could “increase the possibility of outbreak or escalation of conflict.”³⁶⁵

Propose a global missile launch notification regime to China. The United States should propose a global ballistic and cruise missile launch notification regime to China covering all missiles flown to a range of more than 300 kilometers, irrespective of payload type.³⁶⁶ Such a regime may explicitly exclude related systems, including SLVs, sounding rockets, and uncrewed aerial platforms. While the specific contours of such a regime should be negotiated between China and the United States, a useful starting point for compiling such a proposal could be the existing China-Russia missile launch notification regime, which has the advantage of already being nominally acceptable to Beijing.³⁶⁷ While China and Russia have greater levels of mutual trust than China and the United States, their launch notification agreement includes a relatively low-range threshold of 2,000 kilometers for required launch notifications. (Missiles below this range are entirely ungoverned by their agreement.) It includes a supplementary feature not seen in other, similar notification ar-

rangements where the azimuth of a given launch is given special consideration: both countries are only required to notify the other of a missile launch that may be carried out in the direction of the other's borders. Because this proposal would not require Beijing to actively reveal information beyond what the United States can already access through its own national technical means,³⁶⁸ it may be more acceptable than other transparency measures pertaining to missiles. As China builds out its own space-based missile warning capabilities, it could gain greater confidence that the United States was not underreporting its own launches. Importantly, such a notification regime could be later expanded to incorporate the capabilities of U.S. allies, which may reasonably test long-range missiles on azimuths toward China; these allies and China alike may see benefits from the transparency provided by such a launch notification regime. Finally, such a regime would have the advantage of not requiring any special verification protocol.

Consider horizontal escalation potential. The U.S. Indo-Pacific Command should plan for the possibility of inadvertent horizontal escalation of China-specific crises with North Korea and vice versa due to the fungibility of both adversaries' missile capabilities and the possibility of misperception and ambiguity. Given the possibility of the United States massing air- and sea-based platforms in Northeast Asia capable of launching cruise missiles in a North Korea-related contingency—possibly supported by new ground-launched ballistic and hypersonic missiles deployed in the region—Washington should plan to use military communication channels with Beijing to avoid misperceptions that could emerge. It is in the United States' best interests to ensure that military operations against North Korea are not misperceived by Beijing as potentially threatening its territory and interests. Planning for a horizontal escalation scenario should also consider appropriate deterrence messaging toward North Korea in the context of a U.S.-China military crisis in the Taiwan Strait or the South China Sea. Operational considerations, including those concerning the possibility of covert China–North Korea information sharing, could mean that assurances could be largely general. The United States should encourage its allies to consider similar assurances.

WHAT THE UNITED STATES AND ITS ALLIES CAN DO

Address the role of allied strike capabilities in bilateral extended deterrence dialogues, strategic dialogues, and trilateral consultations. As U.S. allies improve their autonomous strike capabilities, the role of these capabilities in contributing to deterrence of general war and possible escalation in a crisis should be discussed at working-level dialogues on extended deterrence. Both Taiwan Strait and Korean Peninsula crises should be covered in these discussions. These issues should first be raised through civilian-led dialogues. Appropriate forums here include the Korea-U.S. Integrated Defense Dialogue and the related Nuclear Consultative Group in the U.S.-South Korea alliance; the bilateral Extended Deterrence Dialogue with Japan; and the bilateral Strategic Policy Dialogue with Australia. Where possible, the United States and its allies should hold bilateral and plurilateral tabletop exercises

to explore such scenarios. In the context of the U.S.–South Korea alliance, Washington and Seoul should move with expediency to delivery on the April 2023 Washington Declaration’s pledge to more “closely connect” South Korea’s new K-STRATCOM with the alliance’s existing Combined Forces Command. This connectivity can promote better escalation management. Further, Japan’s pursuit of strike capabilities will give Tokyo the ability to influence the course of a contingency with North Korea. So, Japan, South Korea, and the United States should establish a working-level trilateral dialogue on strategic deterrence where these issues can be discussed. Such a group could be established pursuant to the call during the 2022 Phnom Penh trilateral leaders’ summit for the three countries to “work together to strengthen deterrence” and pursuant to subsequent commitments made during a 2023 Camp David summit for the countries to coordinate more closely.³⁶⁹ If political sensitivities—for instance, between Seoul and Tokyo—prevent such dialogue, the three countries should support track 1.5 efforts to promote dialogue on escalation dynamics in Northeast Asia with a focus on new strike capabilities.

Invest in camouflage, concealment, deception, and other passive defenses. A primary driver of missile proliferation in the region is concern about adversary missiles inflicting unacceptable levels of damage against critical military installations in the early moments of a crisis. To allay this concern, U.S. allies—primarily Japan and South Korea—are investing in strike capabilities that they hope to use to shoot the proverbial archer, thereby mitigating damage to critical air bases, ports, and command and control nodes on their soil. While these states are unlikely to abandon these damage-limiting strategies, they and the United States should exploit passive defenses to buttress critical military facilities and limit damage from adversary attacks. The scope of passive defense techniques should include physical hardening, force dispersal (including through the construction of new facilities, if feasible), information operations, deception, camouflage, and the improvement of early warning of missile attacks. Although these measures would increase peacetime maintenance and logistics costs, a comprehensive focus on passive defenses in Northeast Asia could significantly augment deterrence by denial of adversary missile strikes in a crisis by complicating targeting and mitigating pressures for disproportionate continued investments in strike capabilities.

Forswear preemptive attacks on national leadership. To mitigate destabilizing, use-or-lose incentives to rapidly employ nuclear weapons in a crisis, regional states should forswear the deliberate targeting of national leadership in preemptive strikes. This is most pertinent to states seeking to deter North Korean nuclear use given that Pyongyang maintains a low threshold for nuclear use and has codified policies threatening “automatic” and “immediate” nuclear retaliation if its national leadership or nuclear command and control systems are attacked. Specifically, Japan, South Korea, and the United States should publicly forswear preemptive attacks on the national leadership of North Korea. South Korea and the United States explicitly adopt policies that threaten the survival of North Korea’s national leadership in the aftermath of nuclear use, but they offer insufficient parallel assurances that these threats would not be carried out in the absence of North Korean nuclear use in

a crisis. Both South Korea and the United States possess prompt, precise strike capabilities that could credibly threaten preemptive decapitation strikes if sufficient targeting information on the North Korean leadership is available at the time. Similar assurances should be offered to China's leaders to mitigate possible concerns that any crisis could have existential implications for the leadership of the Chinese Communist Party, an attack on whom could increase the incentives for Beijing to defect from its declared no-first-use posture. The United States should further plan to offer verbal assurances to both China and North Korea in the course of a conventional war that it would not seek to use available long-range strike capabilities—nuclear and non-nuclear—to strike leadership targets.

Improve U.S.–Japan–South Korea coordination on missile warning and tracking. The United States, Japan, and South Korea coordinate on data sharing around North Korean missile events but can substantially deepen this cooperation. One motivation to deepen such cooperation is that prompt, public reporting on North Korean missile events by Japanese and South Korean authorities often reveals gaps—real or perceived—in the fidelity of their missile warning systems, which could lead North Korea to improperly assess the efficacy of its strike systems and undermine deterrence. Tokyo and Seoul often disagree on the types and numbers of missiles launched. This may partly be a feature of their sole reliance on terrestrial sensors, including radars, to track missiles. As North Korea has introduced endoatmospheric aeroballistic missiles and other relatively advanced payload types, these divergences have broadened. The United States should begin prompt sharing of missile event assessments derived from its Space Based Infrared System (SBIRS) with the two to the extent it does not already do so. Though Washington may be reluctant to share raw intelligence data derived from SBIRS with its allies given concerns around information security, new protocols could enable the sharing of postlaunch assessments containing information on the numbers and types of missiles. Such sharing would also be in the spirit of the 2022 Phnom Penh trilateral leaders' declaration, which notes that the three allies planned to “share [North Korean] missile warning data in real time to improve each country's ability to detect and assess the threat posed by incoming missiles.”³⁷⁰ To facilitate long-term cooperation, the three countries could also work to establish a trilateral data exchange center staffed by military and intelligence personnel. Such a center could be headquartered in either Tokyo or Seoul. Pending progress on space-based intelligence sharing, Japanese and South Korean military liaisons could also be permanently based at the U.S. Space Operations Command in Colorado.

Offer assurances against rotational missile deployments. If the prospect of permanent allied basing for U.S. ground-launched conventional missiles is expected to remain low for the foreseeable future—as appears to be the case—U.S. consultations with regional allies should clarify whether they will consider the temporary, rotational deployment of missiles in possible future crisis scenarios, a move that could be misperceived as highly escalatory. Depending on these consultations, negative assurances could be implemented as a declaratory measure in defense minister-level or two-plus-two consultations involving foreign and

defense ministers. Because allies may not see reason to forswear such deployments indefinitely, these assurances could be periodically renewed. They could further be tailored to cover only surface-attack missiles, leaving open the possibility of anti-ship missile deployments on a rotational basis, if necessary. If the prospect of permanent allied basing for U.S. conventional missiles changes with respect to Australia, Japan, or South Korea, negative assurances would no longer be necessary.

WHAT THE REGION CAN WORK TOWARD

Put missiles on the regional security agenda. Any shift toward multilateral risk reduction or arms control in the Indo-Pacific will depend on states first recognizing a systemic problem. As more states recognize the risks to peace and stability in the Indo-Pacific due to the proliferation of missile capabilities, they should seek to place these issues on the agenda for discussion at prominent regional forums. Multilateral forums led by ASEAN—including the East Asia Summit, the ASEAN Regional Forum, and the ASEAN Defense Ministers Meeting-Plus—hold promise as relatively inclusive spaces for dialogue. Such forums could allow regional states with prominent missile capabilities to offer assurances about the role these capabilities might play in wartime. Other forums that could usefully contribute to raising awareness of these issues include the Western Pacific Naval Symposium and track 1.5 dialogues, notably the Singapore-based Shangri-La Dialogue.

Work toward an East Asia missile data exchange center. To generally improve transparency, build confidence, and reduce the odds of misperception, regional states should begin exploring the feasibility of establishing a new, multilateral data exchange center focused on gathering information on long-range strike capabilities and missile launches in peacetime.³⁷¹ The success of any such endeavor will depend on the participation of major powers—notably, China and the United States. U.S. allies, including Australia, Japan, and South Korea, could also join. This center could collate information from open sources on known missile activities in the region and aggregate voluntarily shared information by states on missile tests. For instance, all the states mentioned above routinely issue public notices to airmen during live-fire exercises. Such a center would likely need to be established in a relatively neutral state with good relations with both China and the United States; Singapore is one country that meets this requirement. If political conditions prove insurmountable for the establishment of such a center, states interested in greater transparency around missile capabilities could unilaterally volunteer nonsensitive information on their capabilities, military exercises, and developmental tests involving new and established missile capabilities. This data exchange center could be established either parallel or pursuant to the creation of separate bilateral and plurilateral launch notification regimes. Interested regional states could similarly volunteer information on their missile capabilities and comment on regional missile dynamics in the ASEAN Regional Forum's annual security outlook publication.³⁷²

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Policymakers and military planners will likely find the above recommendations ambitious given the prized role that missile capabilities play almost universally in deterrence strategies. For reasons including geopolitical sensitivity, alliance management, and domestic politics, some will be easier for officials to contemplate than others. But in times of crisis, it will be in the interest of all regional states to achieve their military goals without prompting undesired nuclear escalation. The near-term recommendations above are the most urgent, but the uncertainty of the regional security environment should prompt regional decision-makers to also consider long-term pathways to reduce risks around missile capabilities. Clarifying intentions, capabilities, and strategies is best done during times of relative peace, even if low levels of trust make credible assurances challenging to offer to one's adversary. Decisionmakers should not wait to manage missile-related risks during a crisis, when leaders may be primed to interpret new information in the worst possible light. The Indo-Pacific's missile buildup has started, and it is unlikely to see a reversal anytime soon. Regional states must act now to mitigate and reduce risks.

NOTES

- 1 In general, short-range missiles are those with ranges between 300 kilometers and 1,000 kilometers, medium-range missiles are those with ranges between 1,000 kilometers and 3,000 kilometers, and intermediate-range missiles are those with ranges between 3,000 and 5,500 kilometers.
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